

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 3 Derby Road				Issued on Date	19/07/2021
Assessment Reference	Design Stage	Prop Type Ref				
Property	Flat 3, 7 Derby Road, Leek, ST13 6HN					
SAP Rating	71 C	DER	N/A	TER	N/A	
Environmental	80 C	% DER<TER	N/A			
CO ₂ Emissions (t/year)	0.99	DFEE	N/A	TFEE	N/A	
General Requirements Compliance	N/A	% DFEE<TFEE	N/A			
Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ratedenergy.co.uk				Assessor ID	p977-0001
Client						

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Orientation	North							
Property Tenure	Owner-occupied							
Transaction Type	New dwelling							
Terrain Type	Urban							
1.0 Property Type	Flat, 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		Internal Floor Area		Average Storey Height		
		16.50 m		21.50 m ²		2.90 m		
7.0 Living Area	18.98			m ²				
8.0 Thermal Mass Parameter	Precise calculation							
Thermal Mass	74.03			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	41.90	37.10
Wall To Corridor		Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure		0.30	9.00	5.95	4.06
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	10.00	
9.2 Internal Walls								
Description		Construction				Kappa (kJ/m ² K)	Area (m ²)	
Internal Wall 1		Plasterboard on timber frame				9.00	20.30	
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	21.50	21.50

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11.1 Party Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Timber I-joists, carpeted	30.00	21.50

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							1.00
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	North							1.89	
Rear	Window	[1] External Wall 1	South	None	0.00					2.88	
Side	Window	[1] External Wall 1	West	None	0.00					0.96	
Side	Window	[1] External Wall 1	East	None	0.00					0.96	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

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

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

 %

External

External lights fitted

Light and motion sensor

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23.0 Electricity Tariff	Standard
24.0 Main Heating 1	Manufacturer
Percentage of Heat	100 %
Main Heating	BGB
SAP Code	102
Efficiency (Sedbuk 2009)	89.5 %
Model Name	
Manufacturer	
Controls	CBE Programmer, room thermostat and TRVs
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2106
Burner Control	On/Off
Flue Type	None or Unknown
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Flow Temperature	Unknown
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HES Instantaneous at point of use
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
SAP Code	909
29.0 Hot Water Cylinder	None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

U-VALUE CALCULATOR REPORT

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Environmental	80 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	0.99	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

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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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General Requirements Compliance	N/A	% DFEE<TFEE	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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Environmental	80 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	0.99	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
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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

PREDICTED ENERGY ASSESSMENT

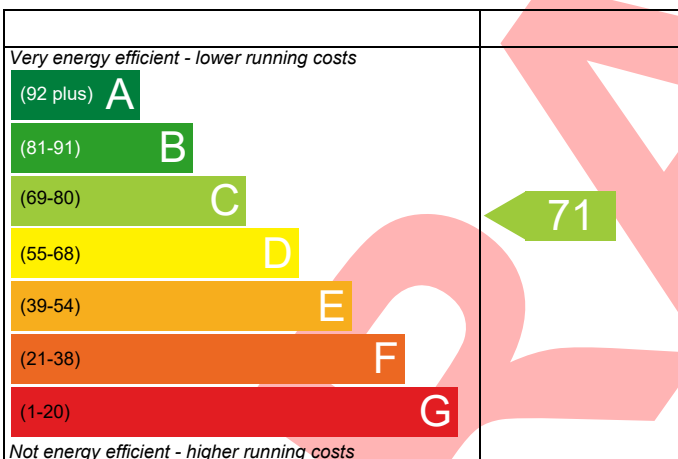
Flat 3, 7 Derby Road,
Leek,
ST13 6HN

Dwelling type: Flat, Semi-Detached
Date of assessment: 19/07/2021
Produced by: A-Rated Energy Services
Total floor area: 21.5 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

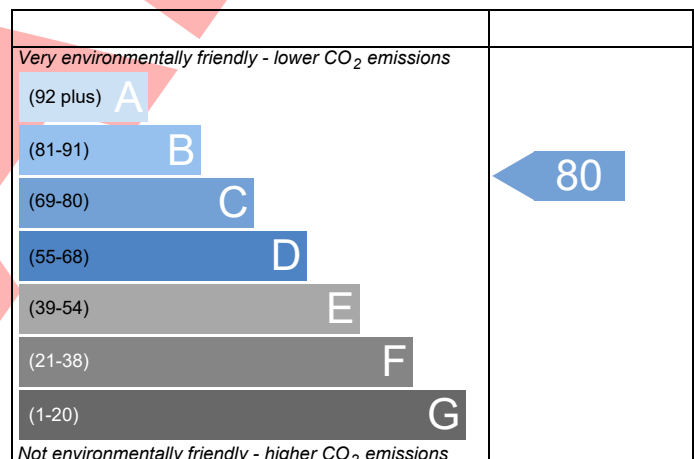


England

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.

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Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ aratedenergy.co.uk			Assessor ID	p977-0001
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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	21.5000 (1b)	x 2.9000 (2b)	= 62.3500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	21.5000		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 62.3500 (5)

2. Ventilation rate

										main heating	secondary heating	other	total	m3 per hour							
										0	+	0	+	0	=	0 * 40 =	0.0000 (6a)				
Number of chimneys										0	+	0	+	0	=	0 * 20 =	0.0000 (6b)				
Number of open flues										0	+	0	+	0	=	2 * 10 =	20.0000 (7a)				
Number of intermittent fans																0 * 10 =	0.0000 (7b)				
Number of passive vents																0 * 40 =	0.0000 (7c)				
Number of flueless gas fires																					
										Air changes per hour											
Infiltration due to chimneys, flues and fans										= (6a)+(6b)+(7a)+(7b)+(7c) =				20.0000 / (5) =		0.3208 (8)					
Pressure test										No											
Measured/design AP50										15.0000											
Infiltration rate										1.0708 (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) =				0.7495 (21)							
Wind speed										Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor										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)
Adj infilt rate										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)
										0.7683	0.7870	0.7683	0.6746	0.6933	0.6184	0.5809	0.5809	0.5996	0.6558	0.6933	0.7308 (22b)
Effective ac										0.7951	0.8097	0.7951	0.7275	0.7403	0.6912	0.6687	0.6687	0.6798	0.7151	0.7403	0.7670 (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)			4.8000	1.5038	7.2180		(27)
External Wall 1	41.9000	4.8000	37.1000	0.2900	10.7590	9.0000	333.9000 (29a)
Wall To Corridor	5.9500	1.8900	4.0600	0.2679	1.0875	9.0000	36.5400 (29a)
External Roof 1	21.5000		21.5000	0.1500	3.2250	9.0000	193.5000 (30)
Total net area of external elements Aum(A, m ²)			69.3500				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.1795		(33)
Party Wall 1			10.0000	0.0000	0.0000	20.0000	200.0000 (32)
Party Floor 1			21.5000			30.0000	645.0000 (32d)
Internal Wall 1			20.3000			9.0000	182.7000 (32c)
Heat capacity Cm = Sum (A x k)					(28)...(30) + (32) + (32a)...(32e) =		1591.6400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							74.0298 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.4025 (36)
Total fabric heat loss						(33) + (36) =	34.5820 (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	16.3601	16.6599	16.3601	14.9693	15.2330	14.2216	13.7592	13.7592	13.9868	14.7129	15.2330	15.7821

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	50.9421	51.2420	50.9421	49.5514	49.8151	48.8036	48.3413	48.3413	48.5688	49.2949	49.8151	50.3642 (39)
Average = Sum(39)m / 12 =												49.6685 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.3694	2.3833	2.3694	2.3047	2.3170	2.2699	2.2484	2.2484	2.2590	2.2928	2.3170	2.3425 (40)
Days in month												2.3102 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0450 (42)
Average daily hot water use (litres/day)												62.1251 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	68.3376	65.8526	63.3676	60.8826	58.3976	55.9126	55.9126	58.3976	60.8826	63.3676	65.8526	68.3376 (44)
Energy content (annual)	101.3427	88.6349	91.4633	79.7399	76.5124	66.0244	61.1813	70.2064	71.0449	82.7960	90.3783	98.1450 (45)
Distribution loss (46)m = 0.15 x (45)m												977.4695 (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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (64)
RHI water heating demand												830.8490 (64)
Heat gains from water heating, kWh/month	21.5353	18.8349	19.4360	16.9447	16.2589	14.0302	13.0010	14.9189	15.0970	17.5941	19.2054	20.8558 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.5733	15.6084	12.6936	9.6099	7.1835	6.0646	6.5530	8.5179	11.4327	14.5164	16.9428	18.0617 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	117.6858	118.9071	115.8296	109.2782	101.0082	93.2355	88.0429	86.8217	89.8991	96.4506	104.7206	112.4932 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001 (71)
Water heating gains (Table 5)	28.9453	28.0282	26.1236	23.5344	21.8533	19.4864	17.4745	20.0522	20.9681	23.6480	26.6741	28.0320 (72)
Total internal gains	230.4195	228.7587	220.8620	208.6375	196.2601	185.0016	178.2855	181.6069	188.5150	200.8301	214.5526	224.8020 (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				0.9600	18.8263	0.6300	0.7000		0.7700		5.5234 (76)	
South				2.8800	44.4251	0.6300	0.7000		0.7700		39.1014 (78)	
West				0.9600	18.8263	0.6300	0.7000		0.7700		5.5234 (80)	
Solar gains	50.1483	87.4055	119.3254	153.0780	163.0848	166.1253	160.6348	147.8541	132.8853	99.9757	60.6269	44.5919 (83)
Total gains	280.5678	316.1642	340.1874	361.7155	359.3449	351.1269	338.9204	329.4610	321.4003	300.8058	275.1795	269.3939 (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	8.6789	8.6281	8.6789	8.9225	8.8753	9.0592	9.1459	9.1459	9.1030	8.9689	8.8753	8.7785
alpha	1.5786	1.5752	1.5786	1.5948	1.5917	1.6039	1.6097	1.6097	1.6069	1.5979	1.5917	1.5852
util living area	0.8836	0.8607	0.8274	0.7713	0.7099	0.6162	0.5407	0.5609	0.6698	0.7847	0.8573	0.8887 (86)
MIT	16.9406	17.2386	17.8592	18.7118	19.4408	20.1204	20.4580	20.4047	19.8989	18.9246	17.8157	16.9157 (87)
Th 2	19.0984	19.0900	19.0984	19.1379	19.1304	19.1594	19.1729	19.1729	19.1662	19.1453	19.1304	19.1148 (88)
util rest of house	0.8658	0.8395	0.7996	0.7314	0.6504	0.5237	0.4158	0.4402	0.5894	0.7405	0.8322	0.8716 (89)
MIT 2	15.6185	15.9011	16.5091	17.3512	18.0315	18.6534	18.9325	18.8960	18.4785	17.5750	16.4993	15.6053 (90)
Living area fraction									fLA = Living area / (4) =			0.8828 (91)
MIT	16.7857	17.0818	17.7010	18.5523	19.2756	19.9485	20.2792	20.2279	19.7324	18.7664	17.6614	16.7622 (92)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

Temperature adjustment													-0.1500
adjusted MIT	16.6357	16.9318	17.5510	18.4023	19.1256	19.7985	20.1292	20.0779	19.5824	18.6164	17.5114		16.6122 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8352	0.8085	0.7714	0.7126	0.6502	0.5592	0.4864	0.5052	0.6100	0.7252	0.8043	0.8415	(94)
Useful gains	234.3391	255.6277	262.4269	257.7761	233.6506	196.3471	164.8672	166.4551	196.0645	218.1565	221.3347	226.6896	(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	669.1591	662.6532	603.7132	505.5379	404.7774	292.7466	223.7803	230.9686	314.8432	439.5331	558.4960	660.3825	(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	323.5061	273.5212	253.9170	178.3885	127.3183	0.0000	0.0000	0.0000	0.0000	164.7042	242.7561	322.6676	(98)
Space heating												1886.7789	(98)
RHI space heating demand												1887	(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	21.5000 (1b)	x 2.9000 (2b)	= 62.3500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	21.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 62.3500 (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) = 0.3208 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.0708 (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) =				0.7495 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9557	0.9369	0.9182	0.8245	0.8058	0.7121	0.7121	0.6933	0.7495	0.8058	0.8432	0.8807 (22b)
Effective ac	0.9566	0.9389	0.9215	0.8399	0.8246	0.7535	0.7535	0.7403	0.7809	0.8246	0.8555	0.8878 (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)			4.8000	1.5038	7.2180		(27)
External Wall 1	41.9000	4.8000	37.1000	0.2900	10.7590	9.0000	333.9000 (29a)
Wall To Corridor	5.9500	1.8900	4.0600	0.2679	1.0875	9.0000	36.5400 (29a)
External Roof 1	21.5000		21.5000	0.1500	3.2250	9.0000	193.5000 (30)
Total net area of external elements Aum(A, m ²)			69.3500				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	24.1795			(33)
Party Wall 1			10.0000	0.0000	0.0000	20.0000	200.0000 (32)
Party Floor 1			21.5000			30.0000	645.0000 (32d)
Internal Wall 1			20.3000			9.0000	182.7000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1591.6400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							74.0298 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.4025 (36)
Total fabric heat loss						(33) + (36) =	34.5820 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	19.6834	19.3186	18.9610	17.2812	16.9670	15.5040	15.5040	15.2330	16.0675	16.9670	17.6027	18.2674 (38)
Heat transfer coeff	54.2655	53.9006	53.5430	51.8633	51.5490	50.0860	50.0860	49.8151	50.6495	51.5490	52.1848	52.8495 (39)
Average = Sum(39)m / 12 =												51.8618 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.5240	2.5070	2.4904	2.4122	2.3976	2.3296	2.3296	2.3170	2.3558	2.3976	2.4272	2.4581 (40)
HLP (average)												2.4122 (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												1.0450 (42)
Average daily hot water use (litres/day)												62.1251 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	68.3376	65.8526	63.3676	60.8826	58.3976	55.9126	55.9126	58.3976	60.8826	63.3676	65.8526	68.3376 (44)
Energy conte	101.3427	88.6349	91.4633	79.7399	76.5124	66.0244	61.1813	70.2064	71.0449	82.7960	90.3783	98.1450 (45)
Energy content (annual)										Total = Sum(45)m =		977.4695 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (64)
Heat gains from water heating, kWh/month	21.5353	18.8349	19.4360	16.9447	16.2589	14.0302	13.0010	14.9189	15.0970	17.5941	19.2054	20.8558 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.5733	15.6084	12.6936	9.6099	7.1835	6.0646	6.5530	8.5179	11.4327	14.5164	16.9428	18.0617	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	117.6858	118.9071	115.8296	109.2782	101.0082	93.2355	88.0429	86.8217	89.8991	96.4506	104.7206	112.4932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	(71)
Water heating gains (Table 5)	28.9453	28.0282	26.1236	23.5344	21.8533	19.4864	17.4745	20.0522	20.9681	23.6480	26.6741	28.0320	(72)
Total internal gains	230.4195	228.7587	220.8620	208.6375	196.2601	185.0016	178.2855	181.6069	188.5150	200.8301	214.5526	224.8020	(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	0.9600				19.6403		0.6300		0.7000		0.7700		5.7622 (76)	
South	2.8800				46.7521		0.6300		0.7000		0.7700		41.1496 (78)	
West	0.9600				19.6403		0.6300		0.7000		0.7700		5.7622 (80)	
Solar gains	52.6740	89.9366	122.9731	151.1723	167.4657	165.2318	159.7419	147.8781	132.8567	99.4397	63.1459	45.0342	(83)	
Total gains	283.0935	318.6954	343.8351	359.8099	363.7259	350.2334	338.0274	329.4850	321.3717	300.2698	277.6985	269.8362	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	8.1474	8.2025	8.2573	8.5248	8.5767	8.8273	8.8273	8.8753	8.7290	8.5767	8.4722	8.3657	
alpha	1.5432	1.5468	1.5505	1.5683	1.5718	1.5885	1.5885	1.5917	1.5819	1.5718	1.5648	1.5577	
util living area	0.8796	0.8543	0.8198	0.7655	0.6925	0.5863	0.4802	0.5006	0.6381	0.7717	0.8498	0.8857	(86)
MIT	17.0509	17.4027	17.9978	18.8091	19.5778	20.2639	20.6290	20.5882	20.0852	19.0973	17.9695	17.0205	(87)
Th 2	19.0069	19.0168	19.0265	19.0727	19.0814	19.1227	19.1227	19.1304	19.1067	19.0814	19.0637	19.0454	(88)
util rest of house	0.8596	0.8303	0.7886	0.7212	0.6249	0.4777	0.3206	0.3469	0.5390	0.7199	0.8214	0.8669	(89)
MIT 2	15.6736	16.0190	16.6006	17.4046	18.1237	18.7444	19.0078	18.9910	18.5976	17.6997	16.6100	15.6684	(90)
Living area fraction	16.8895	17.2406	17.8340	18.6445	19.4074	20.0858	20.4390	20.4010	19.9108	18.9335	17.8101	16.8621	(92)
Temperature adjustment	16.7395	17.0906	17.6840	18.4945	19.2574	19.9358	20.2890	20.2510	19.7608	18.7835	17.6601	-0.1500	
adjusted MIT												16.7121	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8294	0.8002	0.7620	0.7053	0.6320	0.5293	0.4265	0.4458	0.5774	0.7102	0.7949	0.8370	(94)
Ext temp.	234.7979	255.0207	262.0187	253.7788	229.8727	185.3867	144.1753	146.8912	185.5649	213.2561	220.7385	225.8568	(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	675.0341	657.0786	598.8261	497.6011	389.5749	267.2500	184.7677	191.8375	286.7194	421.8493	551.0780	661.2552	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating per m2	327.5358	270.1829	250.5846	175.5520	118.8184	0.0000	0.0000	0.0000	0.0000	155.1933	237.8444	323.9364	(98)
												1859.6479	(98)
												86.4953	(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 %)	90.4000 (206)											
Efficiency of secondary/supplementary heating system, %	0.0000 (208)											
Space heating requirement	2057.1326 (211)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	327.5358	270.1829	250.5846	175.5520	118.8184	0.0000	0.0000	0.0000	0.0000	155.1933	237.8444	323.9364 (98)
Space heating efficiency (main heating system 1)	90.4000	90.4000	90.4000	90.4000	90.4000	0.0000	0.0000	0.0000	0.0000	90.4000	90.4000	90.4000 (210)
Space heating fuel (main heating system)	362.3184	298.8749	277.1954	194.1947	131.4363	0.0000	0.0000	0.0000	0.0000	171.6740	263.1022	358.3367 (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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (219)
Water heating fuel used												830.8490 (219)
Annual totals kWh/year												
Space heating fuel - main system												2057.1326 (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)												124.1398 (232)
Total delivered energy for all uses												3087.1215 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2057.1326	3.4800	71.5882 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	830.8490	13.1900	109.5890 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	124.1398	13.1900	16.3740 (250)
Additional standing charges			120.0000 (251)
Total energy cost			327.4437 (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] = 2.0681 (257)
SAP value	71.1505
SAP rating (Section 12)	71 (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	2057.1326	0.2160	444.3407 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	830.8490	0.5190	431.2107 (264)
Space and water heating			875.5513 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	124.1398	0.5190	64.4286 (268)
Total kg/year			978.9049 (272)
CO2 emissions per m2			45.5300 (273)
EI value			80.2747
EI rating			80 (274)
EI band			C

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9040 = 3.850$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9040 = 0.2389$, 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	21.5000 (1b)	x 2.9000 (2b)	= 62.3500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	21.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 62.3500 (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) = 0.3208 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.0708 (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) =				0.7495 (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												
	0.7683	0.7870	0.7683	0.6746	0.6933	0.6184	0.5809	0.5809	0.5996	0.6558	0.6933	0.7308 (22b)
Effective ac	0.7951	0.8097	0.7951	0.7275	0.7403	0.6912	0.6687	0.6687	0.6798	0.7151	0.7403	0.7670 (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)			4.8000	1.5038	7.2180		(27)
External Wall 1	41.9000	4.8000	37.1000	0.2900	10.7590	9.0000	333.9000 (29a)
Wall To Corridor	5.9500	1.8900	4.0600	0.2679	1.0875	9.0000	36.5400 (29a)
External Roof 1	21.5000		21.5000	0.1500	3.2250	9.0000	193.5000 (30)
Total net area of external elements Aum(A, m ²)			69.3500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	24.1795		(33)
Party Wall 1			10.0000	0.0000	0.0000	20.0000	200.0000 (32)
Party Floor 1			21.5000			30.0000	645.0000 (32d)
Internal Wall 1			20.3000			9.0000	182.7000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1591.6400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							74.0298 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.4025 (36)
Total fabric heat loss						(33) + (36) =	34.5820 (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	16.3601	16.6599	16.3601	14.9693	15.2330	14.2216	13.7592	13.7592	13.9868	14.7129	15.2330	15.7821 (38)
Heat transfer coeff	50.9421	51.2420	50.9421	49.5514	49.8151	48.8036	48.3413	48.3413	48.5688	49.2949	49.8151	50.3642 (39)
Average = Sum(39)m / 12 =												49.6685 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.3694	2.3833	2.3694	2.3047	2.3170	2.2699	2.2484	2.2484	2.2590	2.2928	2.3170	2.3425 (40)
HLP (average)												2.3102 (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												1.0450 (42)
Average daily hot water use (litres/day)												62.1251 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	68.3376	65.8526	63.3676	60.8826	58.3976	55.9126	55.9126	58.3976	60.8826	63.3676	65.8526	68.3376 (44)
Energy conte	101.3427	88.6349	91.4633	79.7399	76.5124	66.0244	61.1813	70.2064	71.0449	82.7960	90.3783	98.1450 (45)
Energy content (annual)										Total = Sum(45)m =		977.4695 (45)
Distribution loss (46)m = 0.15 x (45)m												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF 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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232 (64)
Heat gains from water heating, kWh/month	21.5353	18.8349	19.4360	16.9447	16.2589	14.0302	13.0010	14.9189	15.0970	17.5941	19.2054	20.8558 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	62.7002	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.5733	15.6084	12.6936	9.6099	7.1835	6.0646	6.5530	8.5179	11.4327	14.5164	16.9428	18.0617	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	117.6858	118.9071	115.8296	109.2782	101.0082	93.2355	88.0429	86.8217	89.8991	96.4506	104.7206	112.4932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	42.3150	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	-41.8001	(71)
Water heating gains (Table 5)	28.9453	28.0282	26.1236	23.5344	21.8533	19.4864	17.4745	20.0522	20.9681	23.6480	26.6741	28.0320	(72)
Total internal gains	230.4195	228.7587	220.8620	208.6375	196.2601	185.0016	178.2855	181.6069	188.5150	200.8301	214.5526	224.8020	(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				0.9600	18.8263	0.6300	0.7000	0.7700		5.5234 (76)		
South				2.8800	44.4251	0.6300	0.7000	0.7700		39.1014 (78)		
West				0.9600	18.8263	0.6300	0.7000	0.7700		5.5234 (80)		
Solar gains	50.1483	87.4055	119.3254	153.0780	163.0848	166.1253	160.6348	147.8541	132.8853	99.9757	60.6269	44.5919 (83)
Total gains	280.5678	316.1642	340.1874	361.7155	359.3449	351.1269	338.9204	329.4610	321.4003	300.8058	275.1795	269.3939 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	8.6789	8.6281	8.6789	8.9225	8.8753	9.0592	9.1459	9.1459	9.1030	8.9689	8.8753	8.7785	
alpha	1.5786	1.5752	1.5786	1.5948	1.5917	1.6039	1.6097	1.6097	1.6069	1.5979	1.5917	1.5852	
util living area	0.8836	0.8607	0.8274	0.7713	0.7099	0.6162	0.5407	0.5609	0.6698	0.7847	0.8573	0.8887	(86)
MIT	16.9406	17.2386	17.8592	18.7118	19.4408	20.1204	20.4580	20.4047	19.8989	18.9246	17.8157	16.9157	(87)
Th 2	19.0984	19.0900	19.0984	19.1379	19.1304	19.1594	19.1729	19.1729	19.1662	19.1453	19.1304	19.1148	(88)
util rest of house	0.8658	0.8395	0.7996	0.7314	0.6504	0.5237	0.4158	0.4402	0.5894	0.7405	0.8322	0.8716	(89)
MIT 2	15.6185	15.9011	16.5091	17.3512	18.0315	18.6534	18.9325	18.8960	18.4785	17.5750	16.4993	15.6053	(90)
Living area fraction	16.7857	17.0818	17.7010	18.5523	19.2756	19.9485	20.2792	20.2279	19.7324	18.7664	17.6614	16.7622	(92)
Temperature adjustment	16.6357	16.9318	17.5510	18.4023	19.1256	19.7985	20.1292	20.0779	19.5824	18.6164	17.5114	-0.1500	
adjusted MIT	16.6357	16.9318	17.5510	18.4023	19.1256	19.7985	20.1292	20.0779	19.5824	18.6164	17.5114	16.6122	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8352	0.8085	0.7714	0.7126	0.6502	0.5592	0.4864	0.5052	0.6100	0.7252	0.8043	0.8415	(94)
Ext temp.	234.3391	255.6277	262.4269	257.7761	233.6506	196.3471	164.8672	166.4551	196.0645	218.1565	221.3347	226.6896	(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	669.1591	662.6532	603.7132	505.5379	404.7774	292.7466	223.7803	230.9686	314.8432	439.5331	558.4960	660.3825	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating per m2	323.5061	273.5212	253.9170	178.3885	127.3183	0.0000	0.0000	0.0000	0.0000	164.7042	242.7561	322.6676	(98)
												1886.7789	(98)
												87.7572	(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 %)													90.4000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2087.1448 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	323.5061	273.5212	253.9170	178.3885	127.3183	0.0000	0.0000	0.0000	0.0000	164.7042	242.7561	322.6676	(98)
Space heating efficiency (main heating system 1)	90.4000	90.4000	90.4000	90.4000	90.4000	0.0000	0.0000	0.0000	0.0000	90.4000	90.4000	90.4000	(210)
Space heating fuel (main heating system)	357.8607	302.5676	280.8816	197.3325	140.8388	0.0000	0.0000	0.0000	0.0000	182.1949	268.5355	356.9331	(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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232	(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	86.1413	75.3397	77.7438	67.7790	65.0355	56.1207	52.0041	59.6754	60.3882	70.3766	76.8215	83.4232	(219)
Water heating fuel used												830.8490	(219)
Annual totals kWh/year													
Space heating fuel - main system													2087.1448 (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)													124.1398 (232)
Total delivered energy for all uses													3117.1337 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2087.1448	3.7400	78.0592 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	830.8490	19.1200	158.8583 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	124.1398	19.1200	23.7355 (250)
Additional standing charges			94.0000 (251)
Total energy cost			368.9931 (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	2087.1448	0.2160	450.8233 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	830.8490	0.5190	431.2107 (264)
Space and water heating			882.0339 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	124.1398	0.5190	64.4286 (268)
Total kg/year			985.3875 (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	2087.1448	1.2200	2546.3167 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	830.8490	3.0700	2550.7065 (264)
Space and water heating			5097.0233 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	124.1398	3.0700	381.1093 (268)
Primary energy kWh/year			5708.3825 (272)
Primary energy kWh/m2/year			265.5062 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: C 71
Current environmental impact rating: C 80

(For testing purposes):
A Not considered

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

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

B	Not considered
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: SAP change Cost change CO2 change
(none)

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

Potential energy efficiency rating: C 71
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	£197	£197	£0
Mains gas	£172	£172	£0
Space heating	£186	£186	£0
Water heating	£159	£159	£0
Lighting	£24	£24	£0
Total cost of fuels	£369	£369	£0
Total cost of uses	£369	£369	£0
Delivered energy	145 kWh/m²	145 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m²	46 kg/m²	46 kg/m²	0 kg/m²
Primary energy	266 kWh/m²	266 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 3 Derby Road		Issued on Date	19/07/2021
Assessment Reference	Design Stage	Prop Type Ref		
Project	Flat 3, 7 Derby Road, Leek, ST13 6HN			
Calculation Type	Conversion (As Designed)			

SAP Rating	71 C	DER	N/A	TER	N/A
Environmental	80 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	0.99	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
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Client	
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Roof - 000005

Environmental conditions

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

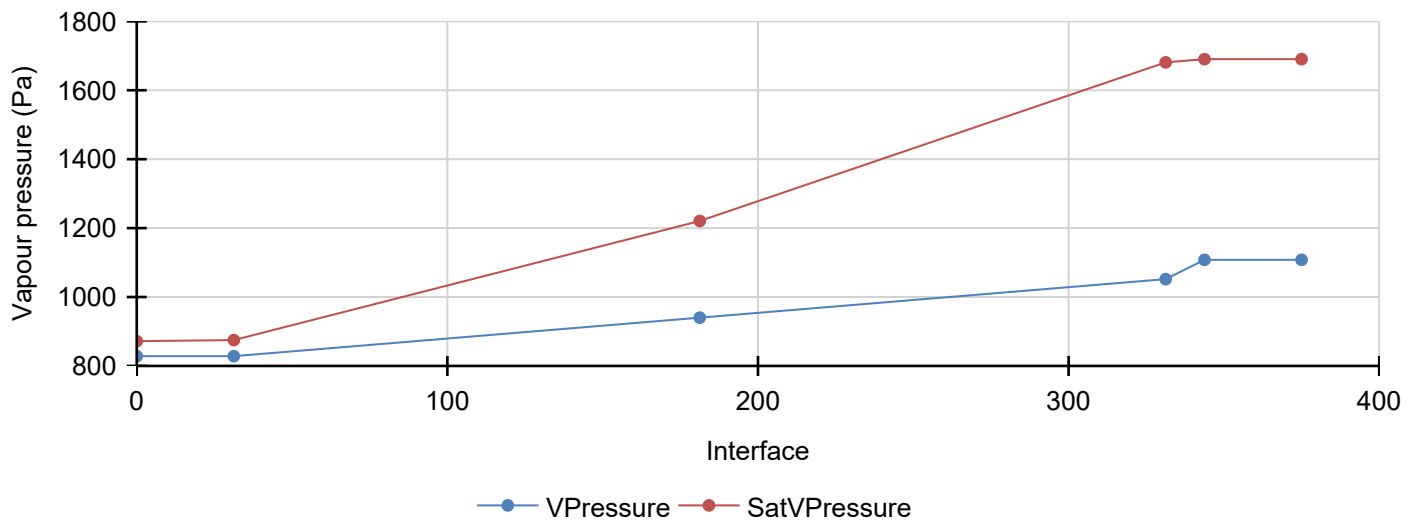
Table of layers

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

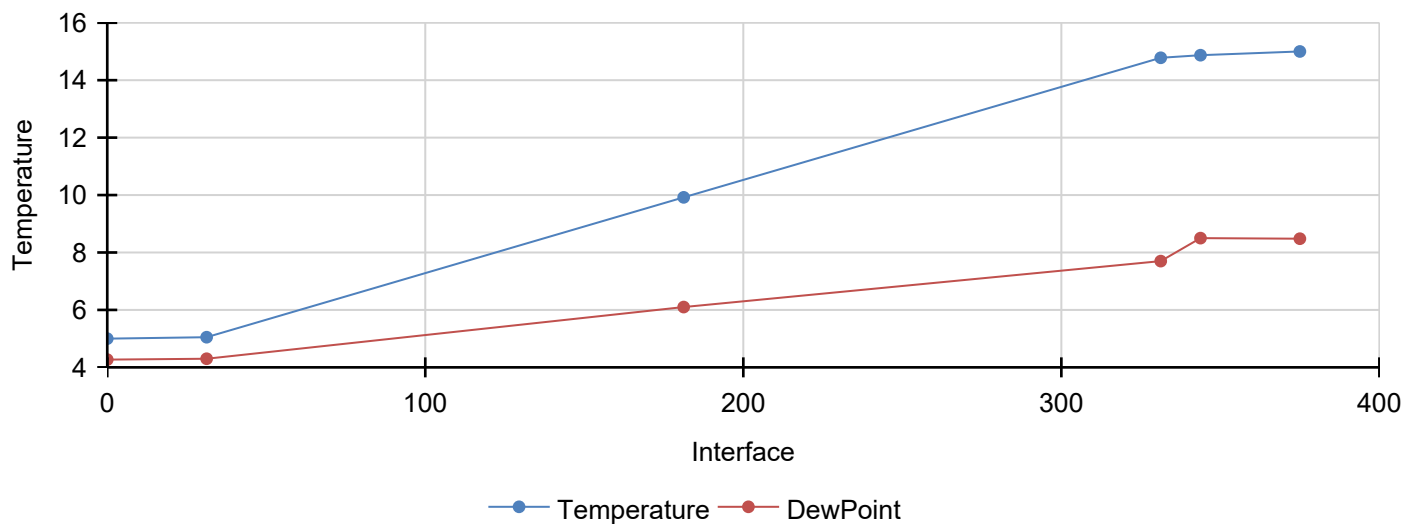
Vapour pressure table

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

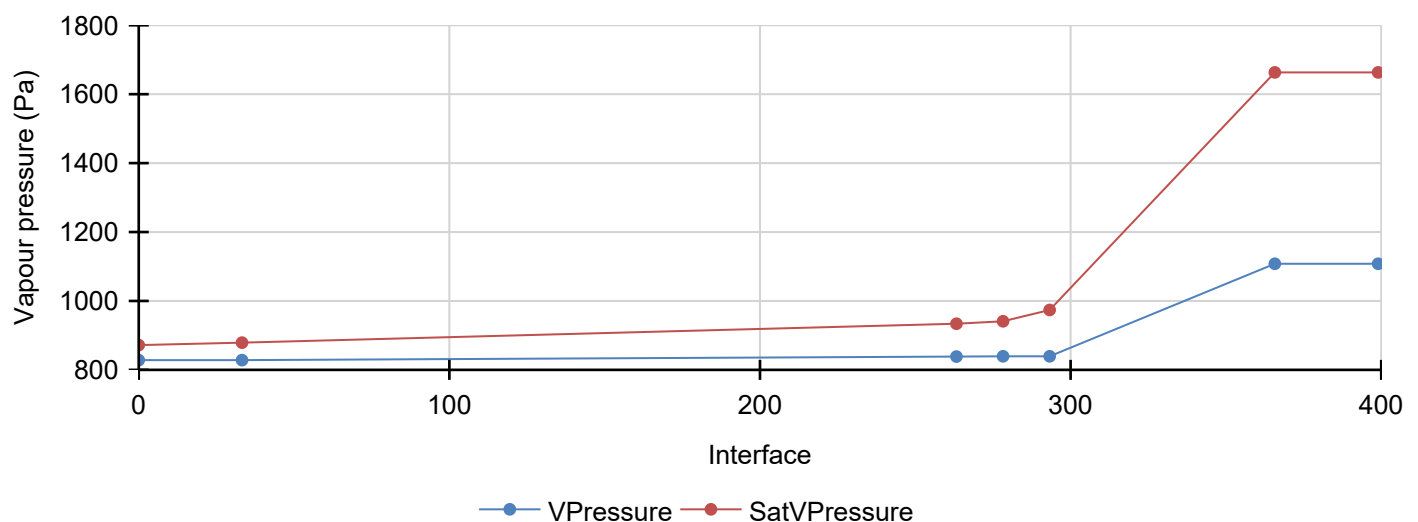
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

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

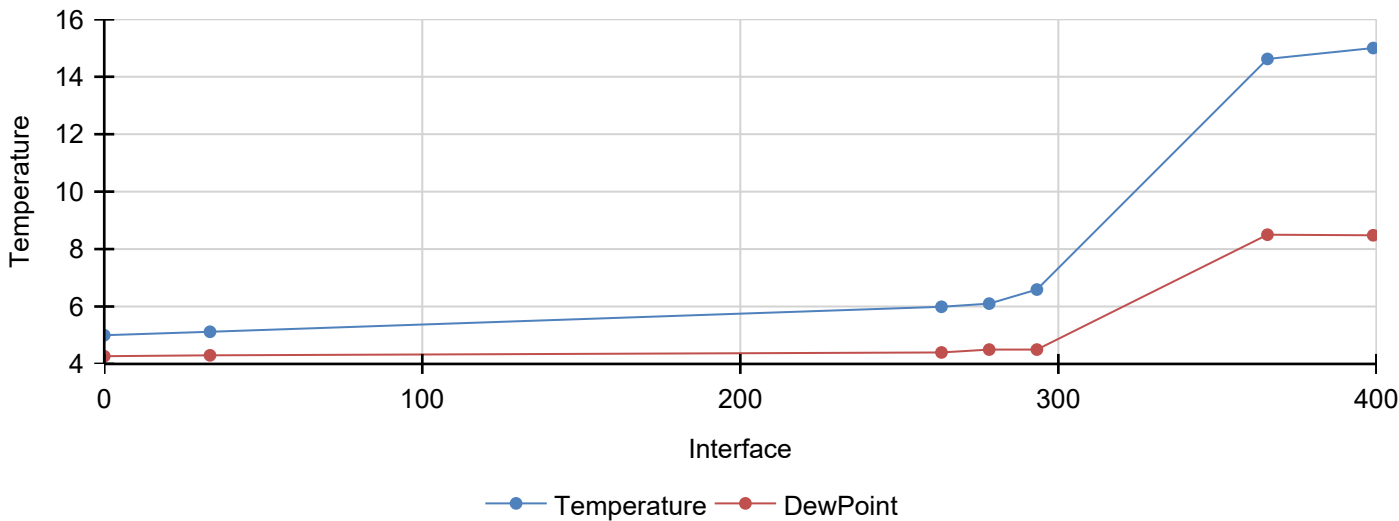
Vapour pressure table

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

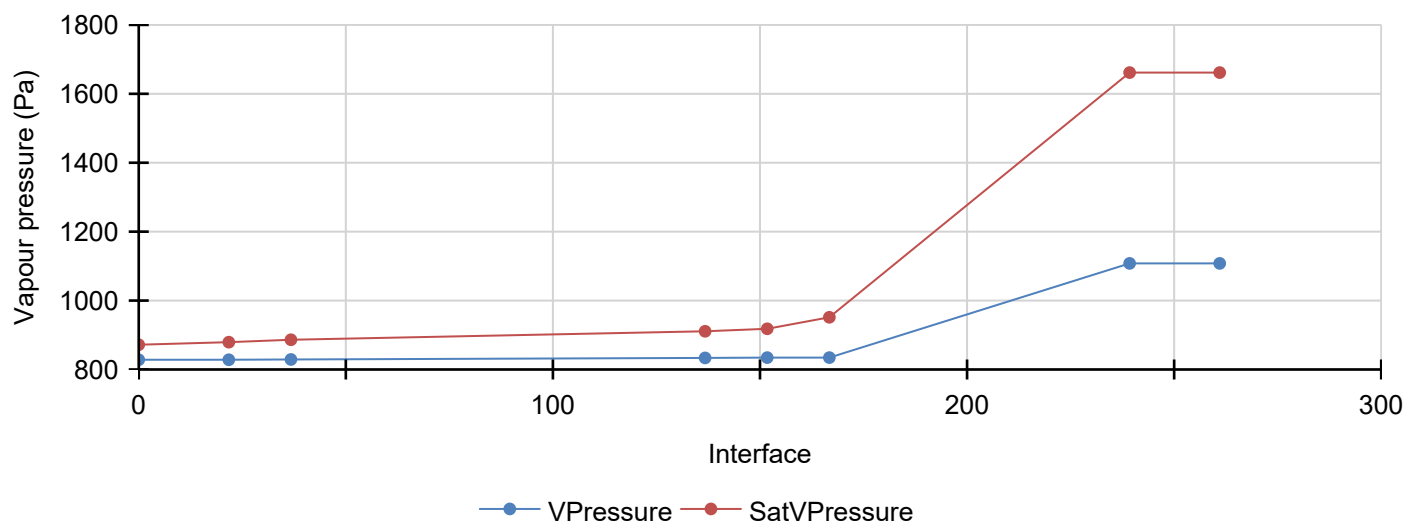
External conditions Temperature: 5 °C Relative Humidity: 95 %
Internal conditions Temperature: 15 °C Relative Humidity: 65 %

Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance 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

