

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 5 Derby Road			Issued on Date	19/07/2021
Assessment Reference	Design Stage	Prop Type Ref			
Property	Flat 5, 7 Derby Road, Leek, ST13 6HN				
SAP Rating	70 C	DER	N/A	TER	N/A
Environmental	79 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.00	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ a-ratedenergy.co.uk			Assessor ID	p977-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South					
Property Tenure	Owner-occupied					
Transaction Type	New dwelling					
Terrain Type	Urban					
1.0 Property Type	Flat, Semi-Detached					
2.0 Number of Storeys	1					
3.0 Date Built	2021					
4.0 Sheltered Sides	4					
5.0 Sunlight/Shade	Average or unknown					
6.0 Measurements						
		Ground Floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height	
			18.20 m	18.50 m²	2.90 m	
7.0 Living Area	11.36			m²		
8.0 Thermal Mass Parameter	Precise calculation					
Thermal Mass	206.53			kJ/m²K		
9.0 External Walls						
Description	Type	Construction		U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)
						Nett Area (m²)
External Wall 1	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure		0.29	9.00	41.76
Wall To Corridor	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure		0.30	9.00	11.02
9.1 Party Walls						
Description	Type	Construction		U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Party Wall 1	Solid Wall	Other		0.00	180.00	7.63
9.2 Internal Walls						
Description	Construction				Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Other				75.00	17.40
10.0 External Roofs						
Description	Type	Construction		U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)
						Nett Area (m²)
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level		0.15	9.00	18.50
11.1 Party Floors						

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

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door to Corridor	Manufacturer	Door to Corridor							1.00
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	South							1.89	
Rear	Window	[1] External Wall 1	North	None	0.00					2.70	
Side	Window	[1] External Wall 1	East	None	0.00					1.43	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

Yes

17.0 Thermal Bridging

Default

Y-value

0.150 W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	Yes
Air change rate	6.00

Mechanical Ventilation

Mechanical Ventilation System Present	No
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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

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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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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/m ² K	Kappa: 0.00 kJ/m ² K

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CO ₂ Emissions (t/year)	1.00	DFEE	N/A	TFEE	N/A
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

PREDICTED ENERGY ASSESSMENT

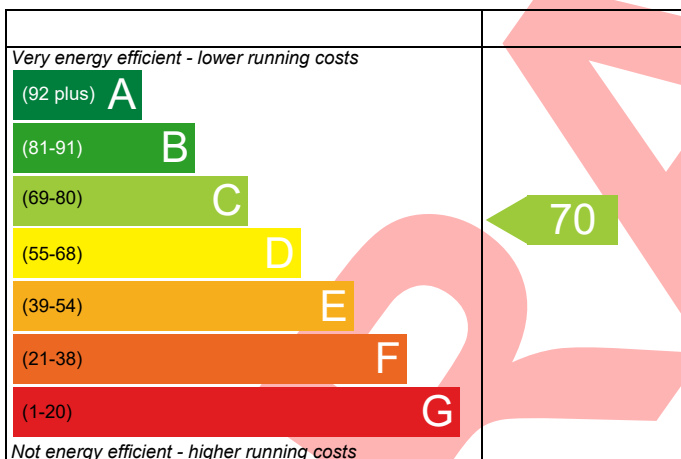
Flat 5, 7 Derby Road,
Leek,
ST13 6HN

Dwelling type: Flat, Semi-Detached
Date of assessment: 19/07/2021
Produced by: A-Rated Energy Services
Total floor area: 18.5 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

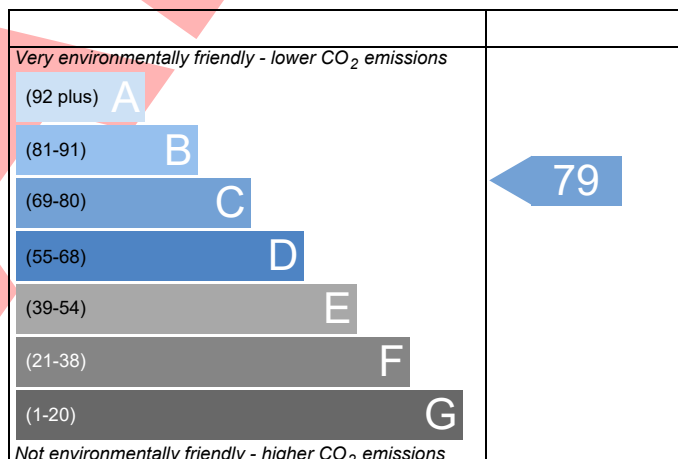


England

EU Directive
2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



England

EU Directive
2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

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

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CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

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

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour					
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000 (6a)					
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000 (6b)					
Number of intermittent fans							2 * 10 =	20.0000 (7a)					
Number of passive vents							0 * 10 =	0.0000 (7b)					
Number of flueless gas fires							0 * 40 =	0.0000 (7c)					
							Air changes per hour						
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =						20.0000 / (5) =	0.3728 (8)					
Pressure test							No						
Measured/design AP50								15.0000					
Infiltration rate								1.1228 (18)					
Number of sides sheltered								4 (19)					
Shelter factor							(20) = 1 - [0.075 x (19)] =	0.7000 (20)					
Infiltration rate adjusted to include shelter factor							(21) = (18) x (20) =	0.7860 (21)					
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.1000	4.2000	4.1000	3.6000	3.7000	3.3000	3.1000	3.1000	3.2000	3.5000	3.7000	3.9000	(22)
Wind factor	1.0250	1.0500	1.0250	0.9000	0.9250	0.8250	0.7750	0.7750	0.8000	0.8750	0.9250	0.9750	(22a)
Adj infilt rate	0.8056	0.8252	0.8056	0.7074	0.7270	0.6484	0.6091	0.6091	0.6288	0.6877	0.7270	0.7663	(22b)
Effective ac	0.8245	0.8405	0.8245	0.7502	0.7643	0.7102	0.6855	0.6855	0.6977	0.7365	0.7643	0.7936	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K					
Door to Corridor			1.8900	1.0000	1.8900		(26)					
New Glazing (Uw = 1.60)			4.1300	1.5038	6.2105		(27)					
External Wall 1	41.7600	4.1300	37.6300	0.2900	10.9127	9.0000	338.6700 (29a)					
Wall To Corridor	11.0200	1.8900	9.1300	0.2679	2.4455	9.0000	82.1700 (29a)					
External Roof 1	18.5000		18.5000	0.1500	2.7750	9.0000	166.5000 (30)					
Total net area of external elements Aum(A, m2)			71.2800				(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	24.2338			(33)					
Party Wall 1			7.6300	0.0000	0.0000	180.0000	1373.4000 (32)					
Party Floor 1			18.5000			30.0000	555.0000 (32d)					
Internal Wall 1			17.4000			75.0000	1305.0000 (32c)					
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	3820.7400 (34)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							206.5265 (35)					
Thermal bridges (Default value 0.150 * total exposed area)							10.6920 (36)					
Total fabric heat loss						(33) + (36) =	34.9258 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 14.5973	Feb 14.8809	Mar 14.5973	Apr 13.2815	May 13.5310	Jun 12.5740	Jul 12.1366	Aug 12.1366	Sep 12.3519	Oct 13.0388	Nov 13.5310	Dec 14.0505 (38)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	49.5230	49.8067	49.5230	48.2073	48.4567	47.4998	47.0623	47.0623	47.2777	47.9646	48.4567	48.9762 (39)
Average = Sum(39)m / 12 =												48.3180 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.6769	2.6923	2.6769	2.6058	2.6193	2.5676	2.5439	2.5439	2.5555	2.5927	2.6193	2.6474 (40)
Days in month												2.6118 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0189 (42)
Average daily hot water use (litres/day)												61.4732 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.6206	65.1616	62.7027	60.2438	57.7848	55.3259	55.3259	57.7848	60.2438	62.7027	65.1616	67.6206 (44)
Energy content (annual)	100.2793	87.7049	90.5037	78.9033	75.7096	65.3316	60.5393	69.4698	70.2995	81.9272	89.4300	97.1152 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		967.2134 (45)
Water storage loss:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (64)
RHI water heating demand												822.1314 (64)
Heat gains from water heating, kWh/month	21.3094	18.6373	19.2320	16.7669	16.0883	13.8830	12.8646	14.7623	14.9386	17.4095	19.0039	20.6370 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	16.1776	14.3688	11.6855	8.8467	6.6130	5.5830	6.0326	7.8414	10.5247	13.3635	15.5972	16.6272 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	108.3389	109.4632	106.6302	100.5990	92.9858	85.8305	81.0503	79.9261	82.7591	88.7902	96.4034	103.5587 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572 (71)
Water heating gains (Table 5)	28.6416	27.7341	25.8495	23.2874	21.6240	19.2819	17.2911	19.8418	20.7481	23.3999	26.3943	27.7379 (72)
Total internal gains	218.6692	217.0771	209.6762	198.2442	186.7340	176.2065	169.8851	173.1204	179.5430	191.0647	203.9059	213.4349 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g	Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d	Gains W	
North				2.7000	10.1716		0.6300	0.7000		0.7700	8.3931 (74)	
East				1.4300	18.8263		0.6300	0.7000		0.7700	8.2276 (76)	
Solar gains	16.6207	32.8381	54.9004	87.8193	108.8320	117.8537	111.0311	90.8692	66.9465	40.3915	20.7942	14.3092 (83)
Total gains	235.2899	249.9152	264.5766	286.0635	295.5659	294.0602	280.9163	263.9896	246.4895	231.4562	224.7001	227.7442 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	21.4308	21.3087	21.4308	22.0157	21.9024	22.3436	22.5513	22.5513	22.4486	22.1271	21.9024	21.6700
util living area	2.4287	2.4206	2.4287	2.4677	2.4602	2.4896	2.5034	2.5034	2.4966	2.4751	2.4602	2.4447
	0.9689	0.9627	0.9480	0.9135	0.8589	0.7650	0.6848	0.7203	0.8427	0.9264	0.9592	0.9709 (86)
MIT	18.1575	18.3090	18.7441	19.3986	19.9637	20.4699	20.6977	20.6448	20.2477	19.5222	18.7685	18.1562 (87)
Th 2	18.9202	18.9118	18.9202	18.9601	18.9524	18.9818	18.9954	18.9954	18.9887	18.9675	18.9524	18.9367 (88)
util rest of house	0.9596	0.9513	0.9309	0.8817	0.7980	0.6476	0.5105	0.5559	0.7560	0.8937	0.9447	0.9622 (89)
MIT 2	16.5264	16.6699	17.1026	17.7604	18.2810	18.7295	18.8995	18.8718	18.5709	17.8953	17.1519	16.5359 (90)
Living area fraction									fLA = Living area / (4) =			0.6141 (91)
MIT	17.5280	17.6764	18.1106	18.7664	19.3142	19.7982	20.0037	19.9605	19.6005	18.8943	18.1446	17.5308 (92)
Temperature adjustment												-0.1500

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adjusted MIT 17.3780 17.5264 17.9606 18.6164 19.1642 19.6482 19.8537 19.8105 19.4505 18.7443 17.9946 17.3808 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9501	0.9410	0.9203	0.8749	0.8057	0.6929	0.5955	0.6332	0.7804	0.8890	0.9354	0.9530	(94)
Useful gains	223.5382	235.1634	243.5024	250.2711	238.1429	203.7404	167.2762	167.1693	192.3706	205.7574	210.1792	217.0457	(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													
	687.2814	673.7036	607.1810	502.1436	395.6129	277.7883	204.8946	212.2765	300.2378	433.8081	566.6812	679.8303	(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													
	345.0249	294.6991	270.5769	181.3482	117.1577	0.0000	0.0000	0.0000	0.0000	169.6697	256.6814	344.3118	(98)
Space heating												1979.4697	(98)
RHI space heating demand												1979	(98)

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CALCULATION OF ENERGY RATINGS 09 Jan 2014

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CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

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

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					2 * 10 = 20.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =				Air changes per hour
Pressure test					20.0000 / (5) = 0.3728 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.1228 (18)
					4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.7860 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	1.0021	0.9824	0.9628	0.8645	0.8449	0.7467	0.7467	0.7270	0.7860	0.8449	0.8842	0.9235 (22b)
Effective ac	1.0021	0.9826	0.9635	0.8737	0.8569	0.7787	0.7787	0.7643	0.8089	0.8569	0.8909	0.9264 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Door to Corridor			1.8900	1.0000	1.8900		(26)
New Glazing (Uw = 1.60)			4.1300	1.5038	6.2105		(27)
External Wall 1	41.7600	4.1300	37.6300	0.2900	10.9127	9.0000	338.6700 (29a)
Wall To Corridor	11.0200	1.8900	9.1300	0.2679	2.4455	9.0000	82.1700 (29a)
External Roof 1	18.5000		18.5000	0.1500	2.7750	9.0000	166.5000 (30)
Total net area of external elements Aum(A, m ²)			71.2800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	24.2338			(33)
Party Wall 1			7.6300	0.0000	0.0000	180.0000	1373.4000 (32)
Party Floor 1			18.5000			30.0000	555.0000 (32d)
Internal Wall 1			17.4000			75.0000	1305.0000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	3820.7400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							206.5265 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.6920 (36)
Total fabric heat loss						(33) + (36) =	34.9258 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	17.7414	17.3963	17.0580	15.4688	15.1714	13.7873	13.7873	13.5310	14.3204	15.1714	15.7729	16.4018 (38)
Heat transfer coeff	52.6672	52.3221	51.9837	50.3945	50.0972	48.7131	48.7131	48.4567	49.2462	50.0972	50.6987	51.3275 (39)
Average = Sum(39)m / 12 =												50.3931 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.8469	2.8282	2.8099	2.7240	2.7080	2.6331	2.6331	2.6193	2.6620	2.7080	2.7405	2.7745 (40)
HLP (average)												2.7240 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0189 (42)
Average daily hot water use (litres/day)												61.4732 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	67.6206	65.1616	62.7027	60.2438	57.7848	55.3259	55.3259	57.7848	60.2438	62.7027	65.1616	67.6206 (44)
Energy conte	100.2793	87.7049	90.5037	78.9033	75.7096	65.3316	60.5393	69.4698	70.2995	81.9272	89.4300	97.1152 (45)
Energy content (annual)												Total = Sum(45)m = 967.2134 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												

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Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (64)
Heat gains from water heating, kWh/month	21.3094	18.6373	19.2320	16.7669	16.0883	13.8830	12.8646	14.7623	14.9386	17.4095	19.0039	20.6370 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	16.1776	14.3688	11.6855	8.8467	6.6130	5.5830	6.0326	7.8414	10.5247	13.3635	15.5972	16.6272	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	108.3389	109.4632	106.6302	100.5990	92.9858	85.8305	81.0503	79.9261	82.7591	88.7902	96.4034	103.5587	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	(71)
Water heating gains (Table 5)	28.6416	27.7341	25.8495	23.2874	21.6240	19.2819	17.2911	19.8418	20.7481	23.3999	26.3943	27.7379	(72)
Total internal gains	218.6692	217.0771	209.6762	198.2442	186.7340	176.2065	169.8851	173.1204	179.5430	191.0647	203.9059	213.4349	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W	
North				2.7000	10.6334	0.6300	0.7000		0.7700		8.7742 (74)	
East				1.4300	19.6403	0.6300	0.7000		0.7700		8.5833 (76)	
Solar gains	17.3575	33.5587	56.1449	86.0956	111.0766	116.5951	109.7881	90.2633	66.4181	39.8837	21.5265	14.3731 (83)
Total gains	236.0267	250.6358	265.8211	284.3399	297.8105	292.8016	279.6732	263.3837	245.9611	230.9485	225.4324	227.8080 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	20.1514	20.2843	20.4163	21.0602	21.1852	21.7871	21.7871	21.9024	21.5512	21.1852	20.9338	20.6773	
alpha	2.3434	2.3523	2.3611	2.4040	2.4123	2.4525	2.4525	2.4602	2.4367	2.4123	2.3956	2.3785	
util living area	0.9660	0.9587	0.9430	0.9079	0.8434	0.7323	0.6112	0.6496	0.8127	0.9166	0.9547	0.9686	(86)
MIT	18.1769	18.3835	18.8075	19.4467	20.0491	20.5637	20.8055	20.7673	20.3758	19.6301	18.8434	18.1881	(87)
Th 2	18.8285	18.8383	18.8480	18.8943	18.9031	18.9446	18.9446	18.9524	18.9285	18.9031	18.8854	18.8670	(88)
util rest of house	0.9552	0.9453	0.9229	0.8715	0.7713	0.5887	0.3802	0.4277	0.6970	0.8757	0.9374	0.9587	(89)
MIT 2	16.4899	16.6987	17.1198	17.7641	18.3223	18.7687	18.9094	18.9029	18.6325	17.9567	17.1839	16.5249	(90)
Living area fraction									fLA = Living area / (4) =			0.6141	(91)
MIT	17.5258	17.7333	18.1562	18.7973	19.3826	19.8709	20.0737	20.0478	19.7030	18.9843	18.2029	17.5462	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.3758	17.5833	18.0062	18.6473	19.2326	19.7209	19.9237	19.8978	19.5530	18.8343	18.0529	17.3962	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9450	0.9345	0.9124	0.8660	0.7851	0.6516	0.5037	0.5444	0.7395	0.8740	0.9281	0.9490	(94)
Ext temp.	223.0497	234.2199	242.5316	246.2426	233.8169	190.7762	140.8793	143.3831	181.8781	201.8444	209.2232	216.1929	(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	688.6667	663.6156	598.1333	491.2116	377.3630	249.4548	161.9082	169.4898	268.5380	412.5129	555.2988	677.3292	(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	346.4191	288.5539	264.5676	176.3777	106.7983	0.0000	0.0000	0.0000	0.0000	156.7374	249.1745	343.0854	(98)
Space heating per m2												1931.7139	(98)
												(98) / (4) =	104.4170 (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													2158.3395 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	346.4191	288.5539	264.5676	176.3777	106.7983	0.0000	0.0000	0.0000	0.0000	156.7374	249.1745	343.0854	(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)	387.0604	322.4066	295.6063	197.0701	119.3277	0.0000	0.0000	0.0000	0.0000	175.1256	278.4072	383.3356	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(219)
Water heating fuel used												822.1314	(219)
Annual totals kWh/year													
Space heating fuel - main system												2158.3395	(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)												114.2804	(232)
Total delivered energy for all uses												3169.7514	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2158.3395	3.4800	75.1102 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	822.1314	13.1900	108.4391 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	114.2804	13.1900	15.0736 (250)
Additional standing charges			120.0000 (251)
Total energy cost			328.5154 (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] =	2.1729 (257)
SAP value		69.6886
SAP rating (Section 12)		70 (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	2158.3395	0.2160	466.2013 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	822.1314	0.5190	426.6862 (264)
Space and water heating			892.8875 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	114.2804	0.5190	59.3115 (268)
Total kg/year			991.1241 (272)
CO2 emissions per m2			53.5700 (273)
EI value			79.0849
EI rating			79 (274)
EI band			C

Calculation of stars for heating and DHW

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

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

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

1. Overall dwelling dimensions

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

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					2 * 10 = 20.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					20.0000 / (5) = 0.3728 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.1228 (18)
Number of sides sheltered					4 (19)
Shelter factor					(20) = 1 - [0.075 x (19)] = 0.7000 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) = 0.7860 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.1000	4.2000	4.1000	3.6000	3.7000	3.3000	3.1000	3.1000	3.2000	3.5000	3.7000	3.9000 (22)
Wind factor	1.0250	1.0500	1.0250	0.9000	0.9250	0.8250	0.7750	0.7750	0.8000	0.8750	0.9250	0.9750 (22a)
Adj infilt rate	0.8056	0.8252	0.8056	0.7074	0.7270	0.6484	0.6091	0.6091	0.6288	0.6877	0.7270	0.7663 (22b)
Effective ac	0.8245	0.8405	0.8245	0.7502	0.7643	0.7102	0.6855	0.6855	0.6977	0.7365	0.7643	0.7936 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Door to Corridor			1.8900	1.0000	1.8900		(26)
New Glazing (Uw = 1.60)			4.1300	1.5038	6.2105		(27)
External Wall 1	41.7600	4.1300	37.6300	0.2900	10.9127	9.0000	338.6700 (29a)
Wall To Corridor	11.0200	1.8900	9.1300	0.2679	2.4455	9.0000	82.1700 (29a)
External Roof 1	18.5000		18.5000	0.1500	2.7750	9.0000	166.5000 (30)
Total net area of external elements Aum(A, m ²)			71.2800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	24.2338		(33)
Party Wall 1			7.6300	0.0000	0.0000	180.0000	1373.4000 (32)
Party Floor 1			18.5000			30.0000	555.0000 (32d)
Internal Wall 1			17.4000			75.0000	1305.0000 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 3820.7400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							206.5265 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.6920 (36)
Total fabric heat loss							(33) + (36) = 34.9258 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	14.5973	14.8809	14.5973	13.2815	13.5310	12.5740	12.1366	12.1366	12.3519	13.0388	13.5310	14.0505 (38)
Heat transfer coeff	49.5230	49.8067	49.5230	48.2073	48.4567	47.4998	47.0623	47.0623	47.2777	47.9646	48.4567	48.9762 (39)
Average = Sum(39)m / 12 =												48.3180 (39)
HLP	2.6769	2.6923	2.6769	2.6058	2.6193	2.5676	2.5439	2.5439	2.5555	2.5927	2.6193	2.6474 (40)
HLP (average)												2.6118 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0189 (42)
Average daily hot water use (litres/day)												61.4732 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.6206	65.1616	62.7027	60.2438	57.7848	55.3259	55.3259	57.7848	60.2438	62.7027	65.1616	67.6206 (44)
Energy content (annual)	100.2793	87.7049	90.5037	78.9033	75.7096	65.3316	60.5393	69.4698	70.2995	81.9272	89.4300	97.1152 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		967.2134 (45)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												

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Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (64)
Heat gains from water heating, kWh/month	21.3094	18.6373	19.2320	16.7669	16.0883	13.8830	12.8646	14.7623	14.9386	17.4095	19.0039	20.6370 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	16.1776	14.3688	11.6855	8.8467	6.6130	5.5830	6.0326	7.8414	10.5247	13.3635	15.5972	16.6272 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	108.3389	109.4632	106.6302	100.5990	92.9858	85.8305	81.0503	79.9261	82.7591	88.7902	96.4034	103.5587 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572 (71)
Water heating gains (Table 5)	28.6416	27.7341	25.8495	23.2874	21.6240	19.2819	17.2911	19.8418	20.7481	23.3999	26.3943	27.7379 (72)
Total internal gains	218.6692	217.0771	209.6762	198.2442	186.7340	176.2065	169.8851	173.1204	179.5430	191.0647	203.9059	213.4349 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b		FF Specific data or Table 6c	Access factor Table 6d		Gains W	
North				2.7000	10.1716	0.6300		0.7000	0.7700		8.3931 (74)	
East				1.4300	18.8263	0.6300		0.7000	0.7700		8.2276 (76)	
Solar gains	16.6207	32.8381	54.9004	87.8193	108.8320	117.8537	111.0311	90.8692	66.9465	40.3915	20.7942	14.3092 (83)
Total gains	235.2899	249.9152	264.5766	286.0635	295.5659	294.0602	280.9163	263.9896	246.4895	231.4562	224.7001	227.7442 (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	21.4308	21.3087	21.4308	22.0157	21.9024	22.3436	22.5513	22.5513	22.4486	22.1271	21.9024	21.6700
alpha	2.4287	2.4206	2.4287	2.4677	2.4602	2.4896	2.5034	2.5034	2.4966	2.4751	2.4602	2.4447
util living area	0.9689	0.9627	0.9480	0.9135	0.8589	0.7650	0.6848	0.7203	0.8427	0.9264	0.9592	0.9709 (86)
MIT	18.1575	18.3090	18.7441	19.3986	19.9637	20.4699	20.6977	20.6448	20.2477	19.5222	18.7685	18.1562 (87)
Th 2	18.9202	18.9118	18.9202	18.9601	18.9524	18.9818	18.9954	18.9954	18.9887	18.9675	18.9524	18.9367 (88)
util rest of house	0.9596	0.9513	0.9309	0.8817	0.7980	0.6476	0.5105	0.5559	0.7560	0.8937	0.9447	0.9622 (89)
MIT 2	16.5264	16.6699	17.1026	17.7604	18.2810	18.7295	18.8995	18.8718	18.5709	17.8953	17.1519	16.5359 (90)
Living area fraction									fLA = Living area / (4) =			0.6141 (91)
MIT	17.5280	17.6764	18.1106	18.7664	19.3142	19.7982	20.0037	19.9605	19.6005	18.8943	18.1446	17.5308 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.3780	17.5264	17.9606	18.6164	19.1642	19.6482	19.8537	19.8105	19.4505	18.7443	17.9946	17.3808 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9501	0.9410	0.9203	0.8749	0.8057	0.6929	0.5955	0.6332	0.7804	0.8890	0.9354	0.9530 (94)
Ext temp.	223.5382	235.1634	243.5024	250.2711	238.1429	203.7404	167.2762	167.1693	192.3706	205.7574	210.1792	217.0457 (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	687.2814	673.7036	607.1810	502.1436	395.6129	277.7883	204.8946	212.2765	300.2378	433.8081	566.6812	679.8303 (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	345.0249	294.6991	270.5769	181.3482	117.1577	0.0000	0.0000	0.0000	0.0000	169.6697	256.6814	344.3118 (98)
Space heating per m2												1979.4697 (98)
										(98) / (4) =		106.9984 (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													2211.6980 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	345.0249	294.6991	270.5769	181.3482	117.1577	0.0000	0.0000	0.0000	0.0000	169.6697	256.6814	344.3118	(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)	385.5027	329.2727	302.3205	202.6237	130.9025	0.0000	0.0000	0.0000	0.0000	189.5751	286.7949	384.7059	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(219)
Water heating fuel used												822.1314	(219)
Annual totals kWh/year													
Space heating fuel - main system												2211.6980	(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)												114.2804	(232)
Total delivered energy for all uses												3223.1098	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2211.6980	3.7400	82.7175 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	822.1314	19.1200	157.1915 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	114.2804	19.1200	21.8504 (250)
Additional standing charges			94.0000 (251)
Total energy cost			370.0994 (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	2211.6980	0.2160	477.7268 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	822.1314	0.5190	426.6862 (264)
Space and water heating			904.4130 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	114.2804	0.5190	59.3115 (268)
Total kg/year			1002.6495 (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	2211.6980	1.2200	2698.2716 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	822.1314	3.0700	2523.9433 (264)
Space and water heating			5222.2149 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	114.2804	3.0700	350.8410 (268)
Primary energy kWh/year			5803.3058 (272)
Primary energy kWh/m2/year			313.6922 (273)

SAP 2012 EPC IMPROVEMENTS

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

(For testing purposes):

A Not considered
B Not considered

FULL SAP CALCULATION PRINTOUT

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

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

Recommended measures:	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 70
 Potential environmental impact rating: C 79

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

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

	Current	Potential	Saving
Electricity	£193	£193	£0
Mains gas	£177	£177	£0
Space heating	£191	£191	£0
Water heating	£157	£157	£0
Lighting	£22	£22	£0
Total cost of fuels	£370	£370	£0
Total cost of uses	£370	£370	£0
Delivered energy	174 kWh/m²	174 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m²	54 kg/m²	54 kg/m²	0 kg/m²
Primary energy	314 kWh/m²	314 kWh/m²	0 kWh/m²

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

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

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

No improvements selected / applicable

CONDENSATION RISK ANALYSIS

Property Reference	Flat 5 Derby Road		Issued on Date	19/07/2021
Assessment Reference	Design Stage	Prop Type Ref		
Project	Flat 5, 7 Derby Road, Leek, ST13 6HN			
Calculation Type	Conversion (As Designed)			

SAP Rating	70 C	DER	N/A	TER	N/A
Environmental	79 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.00	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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Roof - 000005

Environmental conditions

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

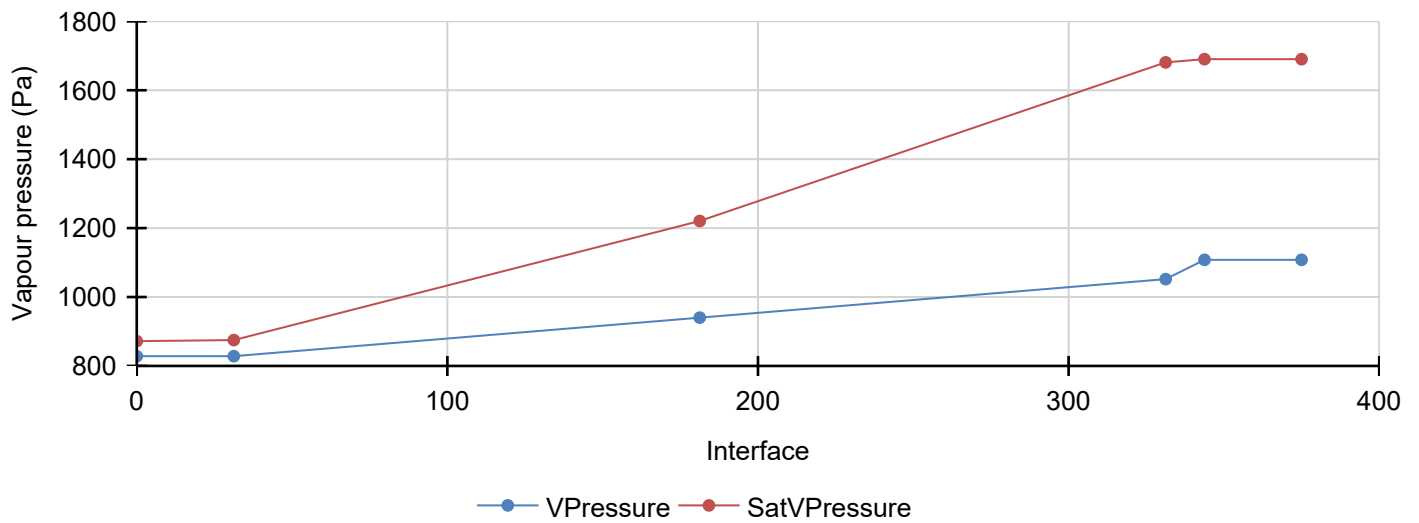
Table of layers

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

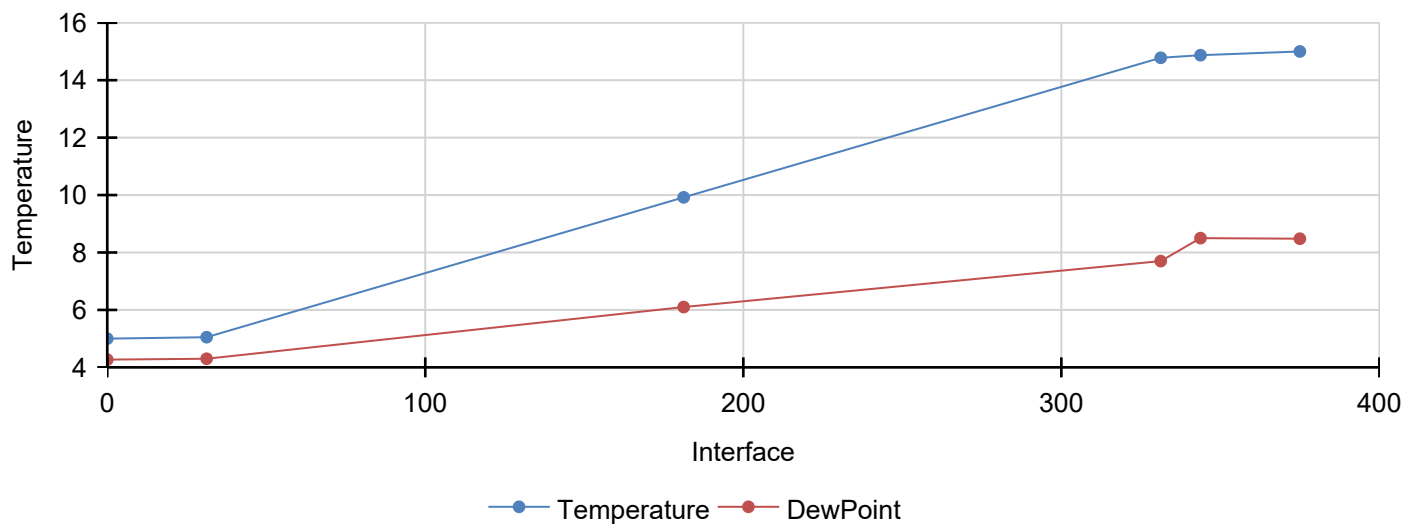
Vapour pressure table

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

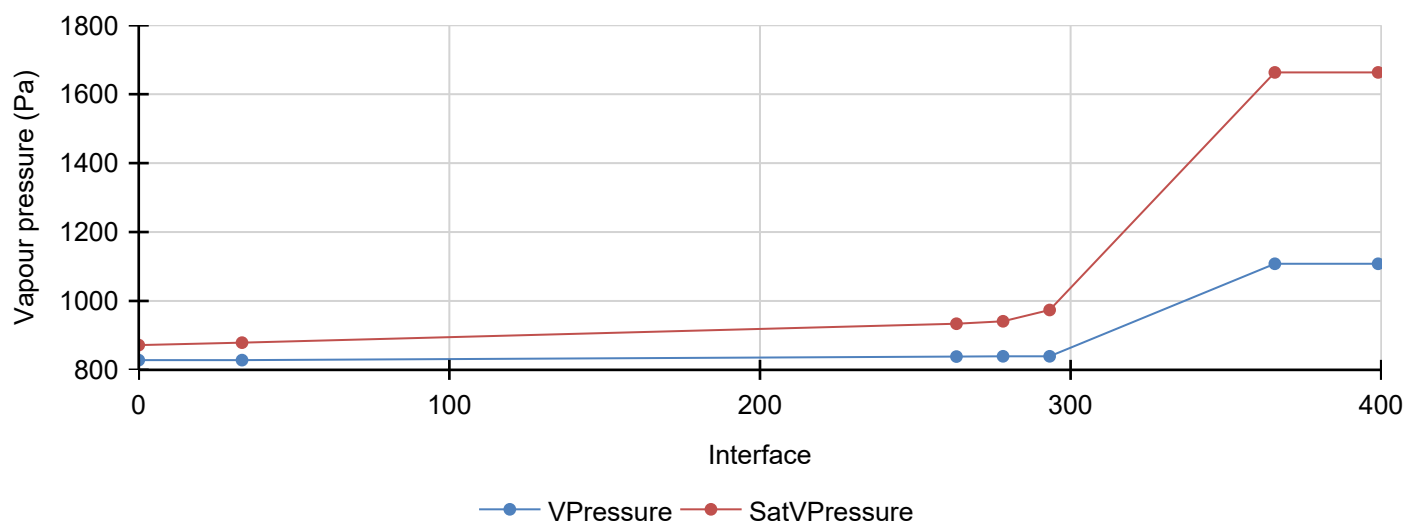
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

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

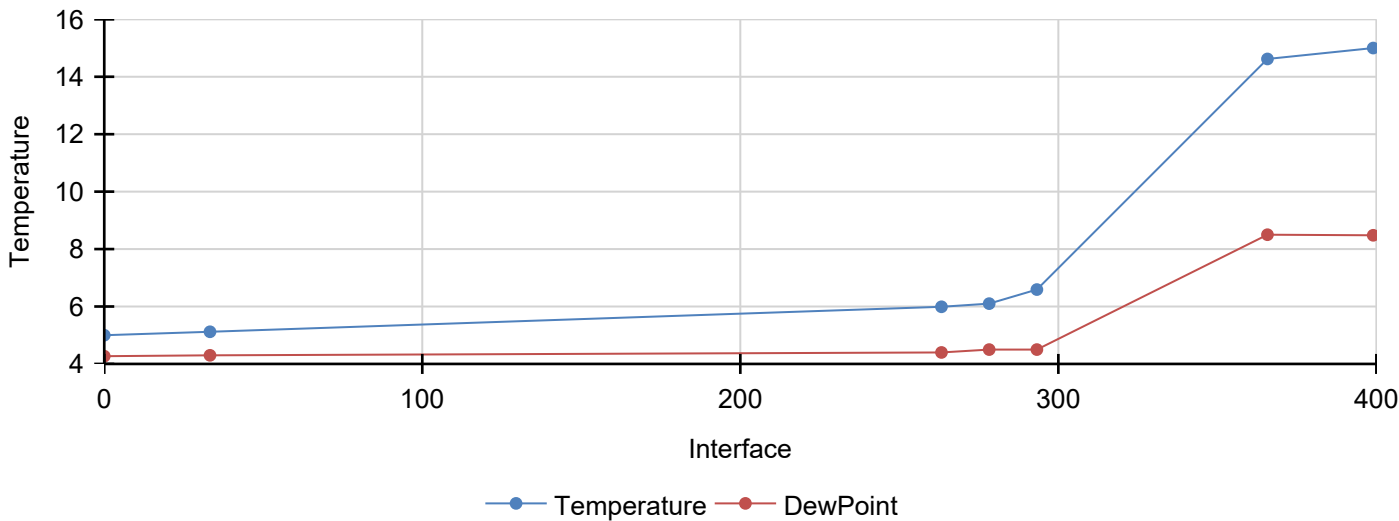
Vapour pressure table

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

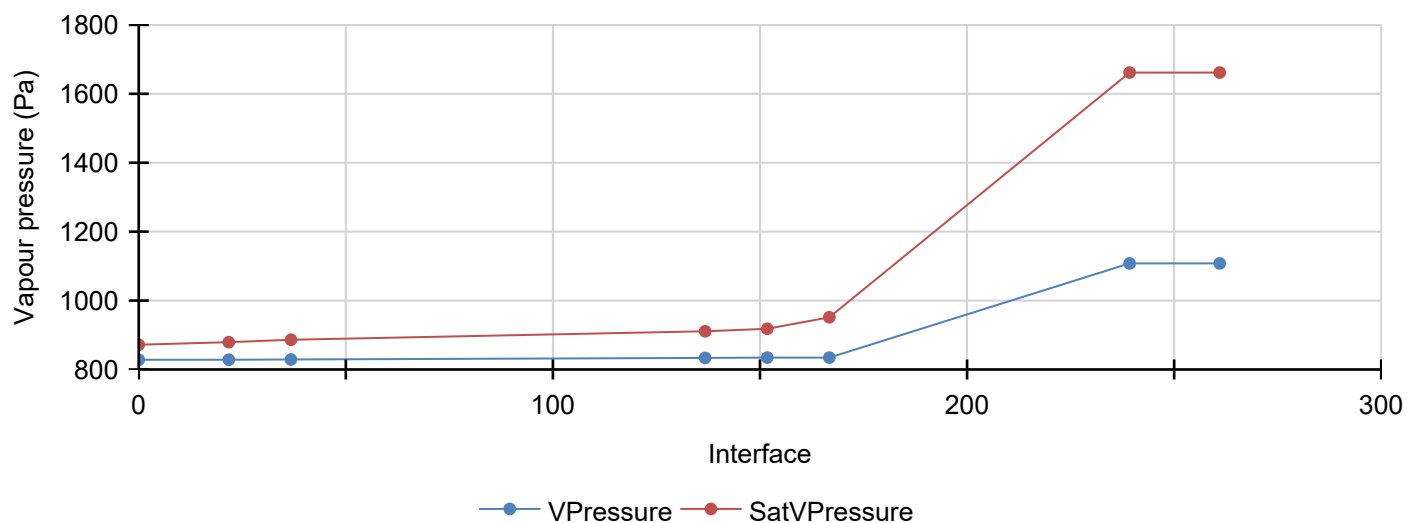
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

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

