

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 2 Derby Road				Issued on Date	19/07/2021
Assessment Reference	Design Stage	Prop Type Ref				
Property	Flat 2, 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)	1.02	DFEE	N/A	TFEE	N/A	
General Requirements Compliance	N/A	% DFEE<TFEE	N/A			
Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ a-ratedenergy.co.uk				Assessor ID	p977-0001
Client						

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Orientation	North						
Property Tenure	Owner-occupied						
Transaction Type	New dwelling						
Terrain Type	Urban						
1.0 Property Type	Flat, 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	
		19.85 m		20.65 m ²		2.90 m	
7.0 Living Area	18.11		m ²				
8.0 Thermal Mass Parameter	Precise calculation						
Thermal Mass	77.89		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	38.92	33.32
Wall To Corridor	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure		0.30	9.00	6.76	4.87
WTC 2	Timber Frame	Timber framed wall (one layer of plasterboard)		0.27	9.00	11.89	11.89
9.2 Internal Walls							
Description	Construction				Kappa (kJ/m ² K)	Area (m ²)	
Internal Wall 1	Plasterboard on timber frame				9.00	13.92	
10.1 Party Ceilings							
Description	Construction				Kappa (kJ/m ² K)	Area (m ²)	
Party Ceilings 1	Timber I-joists, carpeted				20.00	20.65	
11.0 Heat Loss Floors							
Description	Type	Construction		U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	
Exposed	Exposed Floor - Timber	Timber exposed floor, insulation between joists		0.24	20.00	20.65	

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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					4.20	
Side	Window	[1] External Wall 1	West	None	0.00					1.40	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

Yes

17.0 Thermal Bridging

Default

Y-value

0.150

W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Windows fully open

Cross ventilation possible

Yes

Night Ventilation

Yes

Air change rate

6.00

Mechanical Ventilation

Mechanical Ventilation System Present

No

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				2
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings

6

Total number of L.E.L. fittings

6

Percentage of L.E.L. fittings

100.00

%

External

External lights fitted

Yes

Light and motion sensor

Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

Manufacturer

Percentage of Heat

100

%

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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	

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	79 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.02	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

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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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CO ₂ Emissions (t/year)	1.02	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

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Environmental	79 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.02	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@aratedenergy.co.uk	Assessor ID	p977-0001
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Client	
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Building Elements

Wall 000004

Wall Type: Timber framed Wall with I-beams

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Gyproc Wallboard (12.5mm)				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 2	ROCKWOOL RWA45 slab				
	Main construction	100	0.0350	2.8571	87.50
	Main construction	100	0.1300	0.7692	12.50
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	ROCKWOOL RWA45 slab				
	Main construction	50	0.0350	1.4286	87.50
	Main construction	50	0.1300	0.3846	12.50
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	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				0.1300	

Total resistance:	Upper limit = 3.964 m ² K/W	Lower limit = 3.502 m ² K/W	Average = 3.733 m ² K/W
	Total correction = 0.0041 m ² K/W	U-value (unrounded) = 0.27 W/m ² K	

Unheated space: None		
Total thickness: 175 mm	U-value: 0.27 W/m² K	Kappa: n/a

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CO ₂ Emissions (t/year)	1.02	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@aratedenergy.co.uk	Assessor ID	p977-0001
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Client	
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Building Elements

Floor 000003

Floor Type: Exposed Floor

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

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

Unheated space: None

Total thickness: 247 mm

U-value: 0.24 W/m² K

Kappa: n/a

PREDICTED ENERGY ASSESSMENT

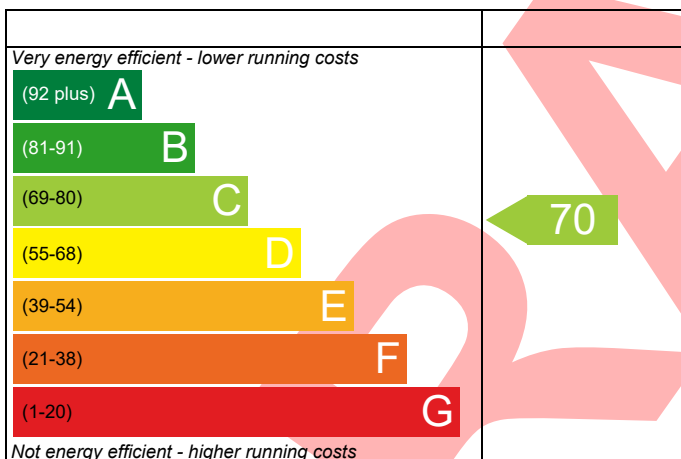
Flat 2, 7 Derby Road,
Leek,
ST13 6HN

Dwelling type: Flat, Detached
Date of assessment: 19/07/2021
Produced by: A-Rated Energy Services
Total floor area: 20.65 m²

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

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

Energy Efficiency Rating

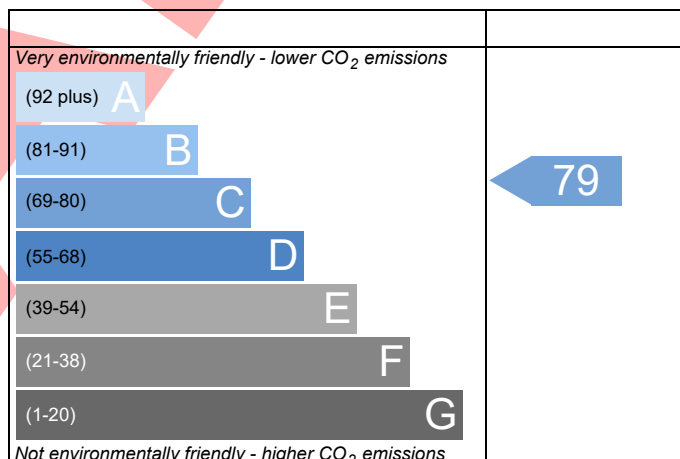


England

EU Directive
2002/91/EC

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

Environmental Impact (CO₂) Rating



England

EU Directive
2002/91/EC

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

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

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	20.6500 (1b)	x 2.9000 (2b)	= 59.8850 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	20.6500		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 59.8850 (5)
Dwelling volume			

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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				20.0000 / (5) =	0.3340 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.0840 (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) =		0.7588 (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	0.7778	0.7967	0.7778	0.6829	0.7019	0.6260	0.5881	0.5881	0.6070	0.6639	0.7019	0.7398 (22b)
Effective ac	0.8024	0.8174	0.8024	0.7332	0.7463	0.6959	0.6729	0.6729	0.6842	0.7204	0.7463	0.7737 (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)			5.6000	1.5038	8.4211		(27)
Exposed			20.6500	0.1200	2.4780	20.0000	413.0000 (28b)
External Wall 1	38.9200	5.6000	33.3200	0.2900	9.6628	9.0000	299.8800 (29a)
Wall To Corridor	6.7600	1.8900	4.8700	0.2679	1.3045	9.0000	43.8300 (29a)
WTC 2	11.8900		11.8900	0.2437	2.8974	9.0000	107.0100 (29a)
Total net area of external elements Aum(A, m ²)			78.2200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.6537		(33)
Party Ceilings 1			20.6500			20.0000	413.0000 (32b)
Internal Wall 1			13.9200			9.0000	125.2800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1402.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							67.8935 (35)
Thermal bridges (Default value 0.150 * total exposed area)							11.7330 (36)
Total fabric heat loss						(33) + (36) =	38.3867 (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	15.8580	16.1531	15.8580	14.4891	14.7487	13.7531	13.2980	13.2980	13.5220	14.2367	14.7487	15.2891 (38)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	54.2447	54.5398	54.2447	52.8758	53.1354	52.1398	51.6847	51.6847	51.9087	52.6234	53.1354	53.6758 (39)
Average = Sum(39)m / 12 =												52.9911 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.6269	2.6412	2.6269	2.5606	2.5731	2.5249	2.5029	2.5029	2.5137	2.5483	2.5731	2.5993 (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												1.0365 (42)
Average daily hot water use (litres/day)												61.9135 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	68.1048	65.6283	63.1518	60.6752	58.1987	55.7221	55.7221	58.1987	60.6752	63.1518	65.6283	68.1048 (44)
Energy content (annual)	100.9975	88.3331	91.1518	79.4684	76.2518	65.7995	60.9729	69.9673	70.8029	82.5140	90.0705	97.8107 (45)
Distribution loss (46)m = 0.15 x (45)m												974.1404 (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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (64)
RHI water heating demand												828.0194 (64)
Heat gains from water heating, kWh/month	21.4620	18.7708	19.3698	16.8870	16.2035	13.9824	12.9567	14.8681	15.0456	17.5342	19.1400	20.7848 (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	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.1767	15.2562	12.4072	9.3931	7.0214	5.9278	6.4052	8.3257	11.1747	14.1889	16.5605	17.6541 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	115.0274	116.2210	113.2131	106.8097	98.7265	91.1294	86.0541	84.8604	87.8683	94.2718	102.3550	109.9521 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558 (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)	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616 (71)
Water heating gains (Table 5)	28.8467	27.9327	26.0346	23.4542	21.7789	19.4200	17.4150	19.9839	20.8967	23.5675	26.5833	27.9365 (72)
Total internal gains	227.0375	225.3965	217.6415	205.6435	193.5134	182.4637	175.8608	179.1566	185.9263	198.0147	211.4854	221.5293 (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	
South				4.2000	44.4251		0.6300	0.7000		0.7700	57.0229 (78)	
West				1.4000	18.8263		0.6300	0.7000		0.7700	8.0550 (80)	
Solar gains	65.0779	111.3795	147.5770	183.0519	190.5336	192.3127	186.6785	174.9342	162.1082	126.0524	78.2850	58.1411 (83)
Total gains	292.1154	336.7761	365.2186	388.6954	384.0470	374.7764	362.5393	354.0908	348.0345	324.0671	289.7703	279.6704 (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	7.1794	7.1405	7.1794	7.3653	7.3293	7.4692	7.5350	7.5350	7.5025	7.4006	7.3293	7.2555
alpha	1.4786	1.4760	1.4786	1.4910	1.4886	1.4979	1.5023	1.5023	1.5002	1.4934	1.4886	1.4837
util living area	0.8719	0.8445	0.8086	0.7513	0.6915	0.6002	0.5264	0.5445	0.6484	0.7643	0.8429	0.8776 (86)
MIT	16.7142	17.0513	17.7012	18.5765	19.3325	20.0415	20.4008	20.3471	19.8212	18.8062	17.6319	16.6819 (87)
Th 2	18.9482	18.9402	18.9482	18.9858	18.9786	19.0063	19.0191	19.0191	19.0128	18.9928	18.9786	18.9637 (88)
util rest of house	0.8520	0.8207	0.7777	0.7077	0.6275	0.5017	0.3938	0.4163	0.5620	0.7156	0.8150	0.8585 (89)
MIT 2	15.3133	15.6323	16.2665	17.1263	17.8307	18.4748	18.7682	18.7317	18.3011	17.3670	16.2337	15.2926 (90)
Living area fraction									fLA = Living area / (4) =			0.8770 (91)
MIT	16.5419	16.8768	17.5248	18.3981	19.1478	19.8488	20.2000	20.1484	19.6342	18.6292	17.4600	16.5110 (92)
Temperature adjustment												-0.1500

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adjusted MIT 16.3919 16.7268 17.3748 18.2481 18.9978 19.6988 20.0500 19.9984 19.4842 18.4792 17.3100 16.3610 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8190	0.7875	0.7480	0.6886	0.6282	0.5397	0.4688	0.4856	0.5853	0.7005	0.7853	0.8259	(94)
Useful gains	239.2563	265.2189	273.1947	267.6643	241.2437	202.2781	169.9745	171.9604	203.6954	226.9990	227.5519	230.9706	(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	699.3161	694.1149	633.2941	531.3011	424.9635	307.5621	235.1639	242.8358	331.3956	461.9919	585.0178	690.3242	(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	342.2845	288.2182	267.9139	189.8185	136.6875	0.0000	0.0000	0.0000	0.0000	174.8347	257.3755	341.7590	(98)
Space heating												1998.8918	(98)
RHI space heating demand												1999	(98)

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1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	20.6500 (1b)	x 2.9000 (2b)	= 59.8850 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	20.6500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 59.8850 (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) = 0.3340 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.0840 (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) = 0.7588 (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												
	0.9674	0.9485	0.9295	0.8347	0.8157	0.7208	0.7208	0.7019	0.7588	0.8157	0.8536	0.8916 (22b)
Effective ac	0.9680	0.9498	0.9320	0.8483	0.8327	0.7598	0.7598	0.7463	0.7879	0.8327	0.8643	0.8974 (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)			5.6000	1.5038	8.4211		(27)
Exposed			20.6500	0.1200	2.4780	20.0000	413.0000 (28b)
External Wall 1	38.9200	5.6000	33.3200	0.2900	9.6628	9.0000	299.8800 (29a)
Wall To Corridor	6.7600	1.8900	4.8700	0.2679	1.3045	9.0000	43.8300 (29a)
WTC 2	11.8900		11.8900	0.2437	2.8974	9.0000	107.0100 (29a)
Total net area of external elements Aum(A, m ²)			78.2200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.6537		(33)
Party Ceilings 1			20.6500			30.0000	619.5000 (32b)
Internal Wall 1			13.9200			9.0000	125.2800 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 1608.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							77.8935 (35)
Thermal bridges (Default value 0.150 * total exposed area)							11.7330 (36)
Total fabric heat loss							(33) + (36) = 38.3867 (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	19.1292	18.7701	18.4181	16.7647	16.4554	15.0153	15.0153	14.7487	15.5700	16.4554	17.0812	17.7354 (38)
Heat transfer coeff	57.5159	57.1568	56.8048	55.1514	54.8421	53.4020	53.4020	53.1354	53.9567	54.8421	55.4679	56.1221 (39)
Average = Sum(39)m / 12 =												55.1499 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.7853	2.7679	2.7508	2.6708	2.6558	2.5861	2.5861	2.5731	2.6129	2.6558	2.6861	2.7178 (40)
HLP (average)												2.6707 (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												1.0365 (42)
Average daily hot water use (litres/day)												61.9135 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	68.1048	65.6283	63.1518	60.6752	58.1987	55.7221	55.7221	58.1987	60.6752	63.1518	65.6283	68.1048 (44)
Energy conte	100.9975	88.3331	91.1518	79.4684	76.2518	65.7995	60.9729	69.9673	70.8029	82.5140	90.0705	97.8107 (45)
Energy content (annual)										Total = Sum(45)m =		974.1404 (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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (64)
Heat gains from water heating, kWh/month	21.4620	18.7708	19.3698	16.8870	16.2035	13.9824	12.9567	14.8681	15.0456	17.5342	19.1400	20.7848 (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	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.1767	15.2562	12.4072	9.3931	7.0214	5.9278	6.4052	8.3257	11.1747	14.1889	16.5605	17.6541	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	115.0274	116.2210	113.2131	106.8097	98.7265	91.1294	86.0541	84.8604	87.8683	94.2718	102.3550	109.9521	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	(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)	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	(71)
Water heating gains (Table 5)	28.8467	27.9327	26.0346	23.4542	21.7789	19.4200	17.4150	19.9839	20.8967	23.5675	26.5833	27.9365	(72)
Total internal gains	227.0375	225.3965	217.6415	205.6435	193.5134	182.4637	175.8608	179.1566	185.9263	198.0147	211.4854	221.5293	(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		
South				4.2000	46.7521	0.6300	0.7000	0.7700		60.0098 (78)		
West				1.4000	19.6403	0.6300	0.7000	0.7700		8.4032 (80)		
Solar gains	68.4130	114.7191	152.2639	180.9769	195.8332	191.4297	185.7991	175.1478	162.2636	125.5105	81.6099	58.7644 (83)
Total gains	295.4505	340.1156	369.9054	386.6204	389.3466	373.8934	361.6599	354.3044	348.1899	323.5252	293.0953	280.2937 (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	7.7684	7.8172	7.8656	8.1014	8.1471	8.3668	8.3668	8.4088	8.2808	8.1471	8.0552	7.9613	
alpha	1.5179	1.5211	1.5244	1.5401	1.5431	1.5578	1.5578	1.5606	1.5521	1.5431	1.5370	1.5308	
util living area	0.8781	0.8490	0.8126	0.7580	0.6860	0.5815	0.4757	0.4945	0.6284	0.7637	0.8466	0.8849	(86)
MIT	16.9842	17.3651	17.9742	18.7845	19.5555	20.2452	20.6181	20.5783	20.0757	19.0779	17.9187	16.9426	(87)
Th 2	18.8612	18.8705	18.8798	18.9236	18.9320	18.9713	18.9713	18.9786	18.9560	18.9320	18.9152	18.8977	(88)
util rest of house	0.8565	0.8227	0.7782	0.7096	0.6124	0.4635	0.3025	0.3277	0.5204	0.7068	0.8156	0.8647	(89)
MIT 2	15.5135	15.8847	16.4770	17.2751	17.9915	18.6064	18.8667	18.8512	18.4693	17.5747	16.4617	15.4962	(90)
Living area fraction	16.8033	17.1830	17.7900	18.5989	19.3631	20.0437	20.4027	20.3658	19.8782	18.8930	17.7394	16.7647	(91)
MIT	16.8033	17.1830	17.7900	18.5989	19.3631	20.0437	20.4027	20.3658	19.8782	18.8930	17.7394	16.7647	(92)
Temperature adjustment	16.6533	17.0330	17.6400	18.4489	19.2131	19.8937	20.2527	20.2158	19.7282	18.7430	17.5894	16.6147	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8268	0.7933	0.7531	0.6963	0.6239	0.5226	0.4197	0.4376	0.5661	0.7005	0.7902	0.8353	(94)
Ext temp.	244.2737	269.8150	278.5646	269.2099	242.9035	195.3825	151.7978	155.0291	197.1257	226.6283	231.5961	234.1171	(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	710.5111	693.4843	632.8072	526.6341	412.0357	282.6921	195.0601	202.7551	303.6766	446.5802	581.8270	696.7398	(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	346.8806	284.7058	263.5566	185.3455	125.8344	0.0000	0.0000	0.0000	0.0000	163.6442	252.1663	344.1913	(98)
Space heating per m2												1966.3245	(98)
												95.2215	(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													2197.0106 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	346.8806	284.7058	263.5566	185.3455	125.8344	0.0000	0.0000	0.0000	0.0000	163.6442	252.1663	344.1913	(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)	387.5761	318.1070	294.4766	207.0899	140.5970	0.0000	0.0000	0.0000	0.0000	182.8427	281.7501	384.5712	(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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(219)
Water heating fuel used												828.0194	(219)
Annual totals kWh/year													
Space heating fuel - main system												2197.0106	(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)												121.3387	(232)
Total delivered energy for all uses												3221.3687	(238)

10a. Fuel costs - using Table 12 prices

	Fuel	Fuel price	Fuel cost
	kWh/year	p/kWh	£/year
Space heating - main system 1	2197.0106	3.4800	76.4560 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	828.0194	13.1900	109.2158 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	121.3387	13.1900	16.0046 (250)
Additional standing charges			120.0000 (251)
Total energy cost			331.5688 (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] = 2.1212 (257)
SAP value	70.4088
SAP rating (Section 12)	70 (258)
SAP band	C

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy	Emission factor	Emissions
	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	2197.0106	0.2160	474.5543 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	828.0194	0.5190	429.7421 (264)
Space and water heating			904.2963 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	121.3387	0.5190	62.9748 (268)
Total kg/year			1006.1961 (272)
CO2 emissions per m2			48.7300 (273)
EI value			79.4623
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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1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	20.6500 (1b)	x 2.9000 (2b)	= 59.8850 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	20.6500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 59.8850 (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) = 0.3340 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.0840 (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) = 0.7588 (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	0.7778	0.7967	0.7778	0.6829	0.7019	0.6260	0.5881	0.5881	0.6070	0.6639	0.7019	0.7398 (22b)
Effective ac	0.8024	0.8174	0.8024	0.7332	0.7463	0.6959	0.6729	0.6729	0.6842	0.7204	0.7463	0.7737 (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)			5.6000	1.5038	8.4211		(27)
Exposed			20.6500	0.1200	2.4780	20.0000	413.0000 (28b)
External Wall 1	38.9200	5.6000	33.3200	0.2900	9.6628	9.0000	299.8800 (29a)
Wall To Corridor	6.7600	1.8900	4.8700	0.2679	1.3045	9.0000	43.8300 (29a)
WTC 2	11.8900		11.8900	0.2437	2.8974	9.0000	107.0100 (29a)
Total net area of external elements Aum(A, m ²)			78.2200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.6537		(33)
Party Ceilings 1			20.6500			30.0000	619.5000 (32b)
Internal Wall 1			13.9200			9.0000	125.2800 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 1608.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							77.8935 (35)
Thermal bridges (Default value 0.150 * total exposed area)							11.7330 (36)
Total fabric heat loss							(33) + (36) = 38.3867 (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	15.8580	16.1531	15.8580	14.4891	14.7487	13.7531	13.2980	13.2980	13.5220	14.2367	14.7487	15.2891 (38)
Heat transfer coeff	54.2447	54.5398	54.2447	52.8758	53.1354	52.1398	51.6847	51.6847	51.9087	52.6234	53.1354	53.6758 (39)
Average = Sum(39)m / 12 =												52.9911 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.6269	2.6412	2.6269	2.5606	2.5731	2.5249	2.5029	2.5029	2.5137	2.5483	2.5731	2.5993 (40)
HLP (average)												2.5662 (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												1.0365 (42)
Average daily hot water use (litres/day)												61.9135 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	68.1048	65.6283	63.1518	60.6752	58.1987	55.7221	55.7221	58.1987	60.6752	63.1518	65.6283	68.1048 (44)
Energy conte	100.9975	88.3331	91.1518	79.4684	76.2518	65.7995	60.9729	69.9673	70.8029	82.5140	90.0705	97.8107 (45)
Energy content (annual)										Total = Sum(45)m =		974.1404 (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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (64)
Heat gains from water heating, kWh/month	21.4620	18.7708	19.3698	16.8870	16.2035	13.9824	12.9567	14.8681	15.0456	17.5342	19.1400	20.7848 (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	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.1767	15.2562	12.4072	9.3931	7.0214	5.9278	6.4052	8.3257	11.1747	14.1889	16.5605	17.6541	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	115.0274	116.2210	113.2131	106.8097	98.7265	91.1294	86.0541	84.8604	87.8683	94.2718	102.3550	109.9521	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	(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)	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	(71)
Water heating gains (Table 5)	28.8467	27.9327	26.0346	23.4542	21.7789	19.4200	17.4150	19.9839	20.8967	23.5675	26.5833	27.9365	(72)
Total internal gains	227.0375	225.3965	217.6415	205.6435	193.5134	182.4637	175.8608	179.1566	185.9263	198.0147	211.4854	221.5293	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W			
South				4.2000	44.4251	0.6300	0.7000	0.7700	57.0229 (78)			
West				1.4000	18.8263	0.6300	0.7000	0.7700	8.0550 (80)			
Solar gains	65.0779	111.3795	147.5770	183.0519	190.5336	192.3127	186.6785	174.9342	162.1082	126.0524	78.2850	58.1411 (83)
Total gains	292.1154	336.7761	365.2186	388.6954	384.0470	374.7764	362.5393	354.0908	348.0345	324.0671	289.7703	279.6704 (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	8.2368	8.1923	8.2368	8.4501	8.4088	8.5694	8.6448	8.6448	8.6075	8.4906	8.4088	8.3241	
alpha	1.5491	1.5462	1.5491	1.5633	1.5606	1.5713	1.5763	1.5763	1.5738	1.5660	1.5606	1.5549	
util living area	0.8827	0.8560	0.8209	0.7642	0.7041	0.6116	0.5363	0.5548	0.6607	0.7772	0.8547	0.8882	(86)
MIT	16.8539	17.1852	17.8212	18.6776	19.4102	20.0963	20.4410	20.3893	19.8827	18.8960	17.7501	16.8232	(87)
Th 2	18.9482	18.9402	18.9482	18.9858	18.9786	19.0063	19.0191	19.0191	19.0128	18.9928	18.9786	18.9637	(88)
util rest of house	0.8634	0.8327	0.7903	0.7205	0.6393	0.5109	0.4003	0.4234	0.5727	0.7284	0.8273	0.8698	(89)
MIT 2	15.4357	15.7492	16.3697	17.2108	17.8915	18.5119	18.7903	18.7558	18.3453	17.4402	16.3348	15.4164	(90)
Living area fraction									fLA = Living area / (4) =			0.8770	(91)
MIT	16.6795	17.0085	17.6426	18.4972	19.2234	19.9014	20.2379	20.1884	19.6936	18.7170	17.5760	16.6501	(92)
Temperature adjustment												-0.1500	
adjusted MIT	16.5295	16.8585	17.4926	18.3472	19.0734	19.7514	20.0879	20.0384	19.5436	18.5670	17.4260	16.5001	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.8332	0.8022	0.7632	0.7040	0.6428	0.5527	0.4798	0.4971	0.5993	0.7159	0.8003	0.8399	(94)
Useful gains	243.3879	270.1728	278.7295	273.6234	246.8589	207.1206	173.9599	176.0303	208.5717	232.0039	231.8923	234.9031	(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	706.7797	701.3021	639.6884	536.5391	428.9838	310.3070	237.1253	244.9020	334.4784	466.6092	591.1828	697.7923	(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	344.7635	289.7189	268.5535	189.2993	135.5009	0.0000	0.0000	0.0000	0.0000	174.5464	258.6892	344.3896	(98)
Space heating												2005.4612	(98)
Space heating per m2												97.1168	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

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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													2240.7388 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	344.7635	289.7189	268.5535	189.2993	135.5009	0.0000	0.0000	0.0000	0.0000	174.5464	258.6892	344.3896	(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)	385.2107	323.7082	300.0597	211.5076	151.3976	0.0000	0.0000	0.0000	0.0000	195.0239	289.0382	384.7928	(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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(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	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(219)
Water heating fuel used												828.0194	(219)
Annual totals kWh/year													
Space heating fuel - main system												2240.7388	(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)												121.3387	(232)
Total delivered energy for all uses												3265.0968	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2240.7388	3.7400	83.8036 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	828.0194	19.1200	158.3173 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	121.3387	19.1200	23.2000 (250)
Additional standing charges			94.0000 (251)
Total energy cost			373.6609 (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	2240.7388	0.2160	483.9996 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	828.0194	0.5190	429.7421 (264)
Space and water heating			913.7416 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	121.3387	0.5190	62.9748 (268)
Total kg/year			1015.6414 (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	2240.7388	1.2200	2733.7013 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	828.0194	3.0700	2542.0194 (264)
Space and water heating			5275.7208 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	121.3387	3.0700	372.5098 (268)
Primary energy kWh/year			5878.4806 (272)
Primary energy kWh/m2/year			284.6722 (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

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

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0		0.00 kg/m²

Potential energy efficiency rating: C 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	£196	£196	£0
Mains gas	£178	£178	£0
Space heating	£192	£192	£0
Water heating	£158	£158	£0
Lighting	£23	£23	£0
Total cost of fuels	£374	£374	£0
Total cost of uses	£373	£373	£0
Delivered energy	158 kWh/m²	158 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m²	49 kg/m²	49 kg/m²	0 kg/m²
Primary energy	285 kWh/m²	285 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 2 Derby Road		Issued on Date	19/07/2021
Assessment Reference	Design Stage	Prop Type Ref		
Project	Flat 2, 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)	1.02	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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Wall - 000001

Environmental conditions

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

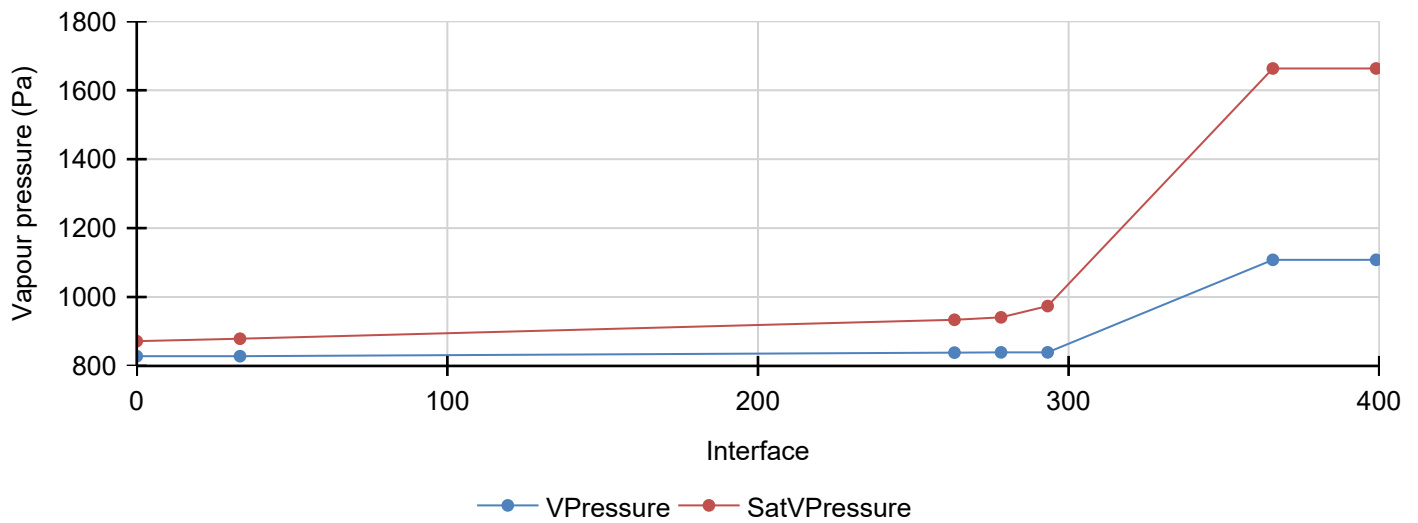
Table of layers

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.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

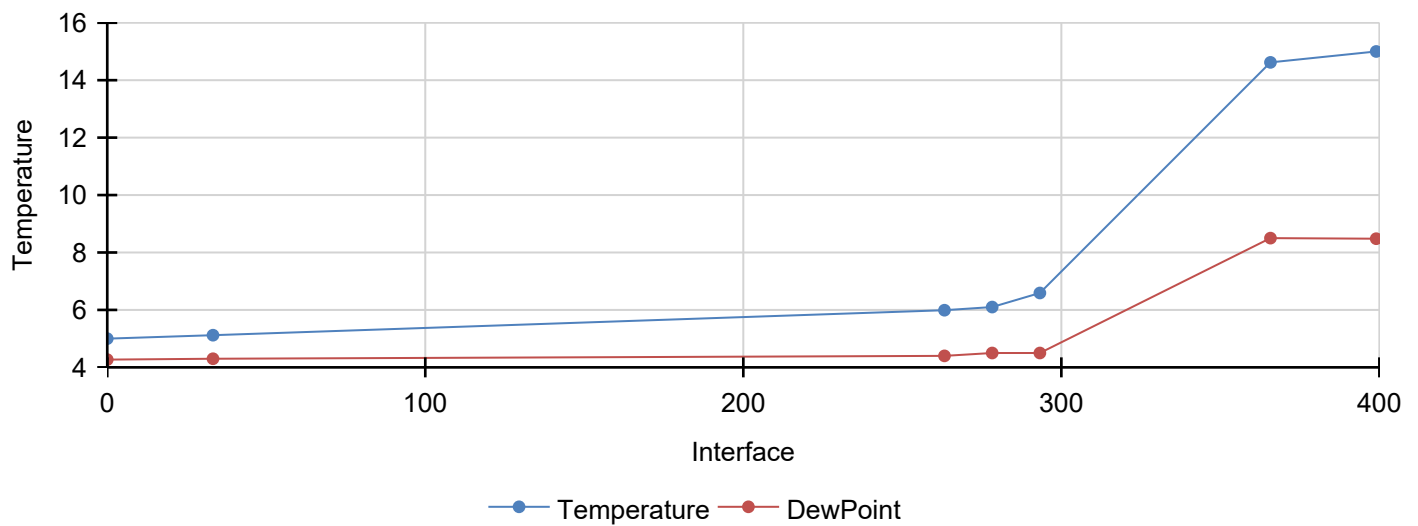
Vapour pressure table

Interface - between layers	Interface temp. °C	Vapour pressure Pa	Satur. vapour pressure Pa	Dew point °C	Cond. rate g/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 / 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

CONDENSATION RISK ANALYSIS



Interface temperature / Dew point graphical representation



CONDENSATION RISK ANALYSIS

Wall - 000002

Environmental conditions

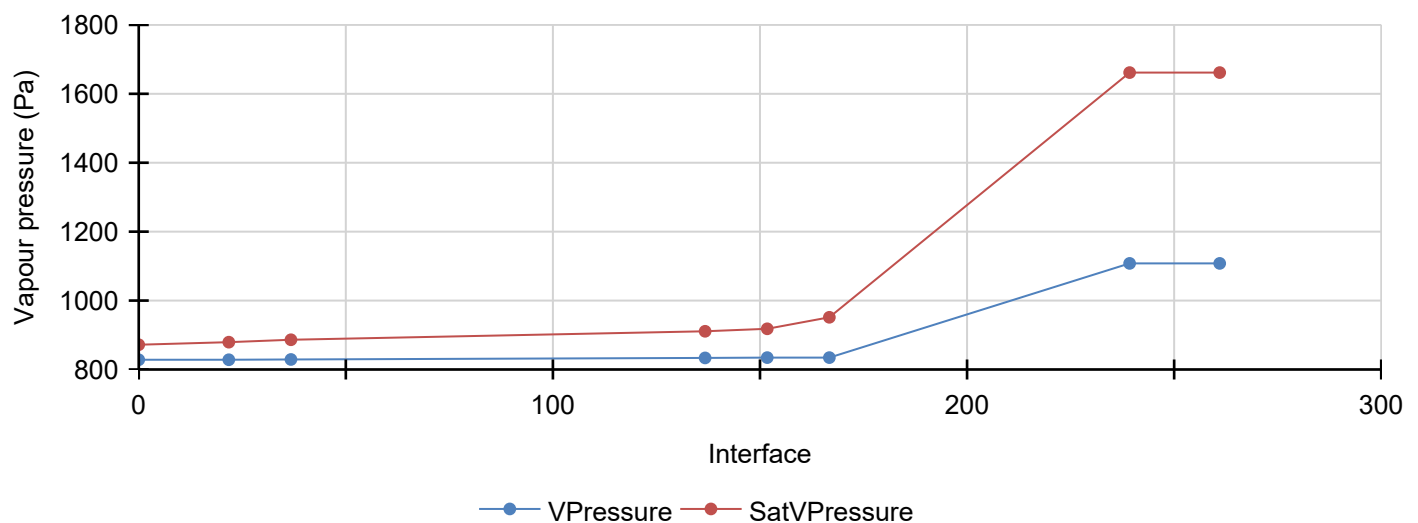
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance m².K/W	Cumulative thermal resistance m².K/W	Vapour resistivity GN.s/kg.m	Vapour resistance GN.s/kg.m	Cumulative vapour resistance GN.s/kg.m
External surface	-	0.0000	0.0400	0.0400	0.0	0.00	0.00
1.Plaster, standard	15.0	0.4000	0.0375	0.0775	60.0	0.90	0.90
2.Brick, outer leaf	100.0	0.7700	0.1299	0.2074	50.0	5.00	5.90
3.Plaster, standard	15.0	0.4000	0.0375	0.2449	60.0	0.90	6.80
4.airspace/plaster dabs	15.0	0.0000	0.1700	0.4149	0.0	0.00	6.80
5.Celotex PL4060 [72.5mm]	72.5	0.0000	2.7500	3.1649	0.000	300.00	306.80
Internal surface	-	0.0000	0.1300	3.1649	0.0	0.00	306.80

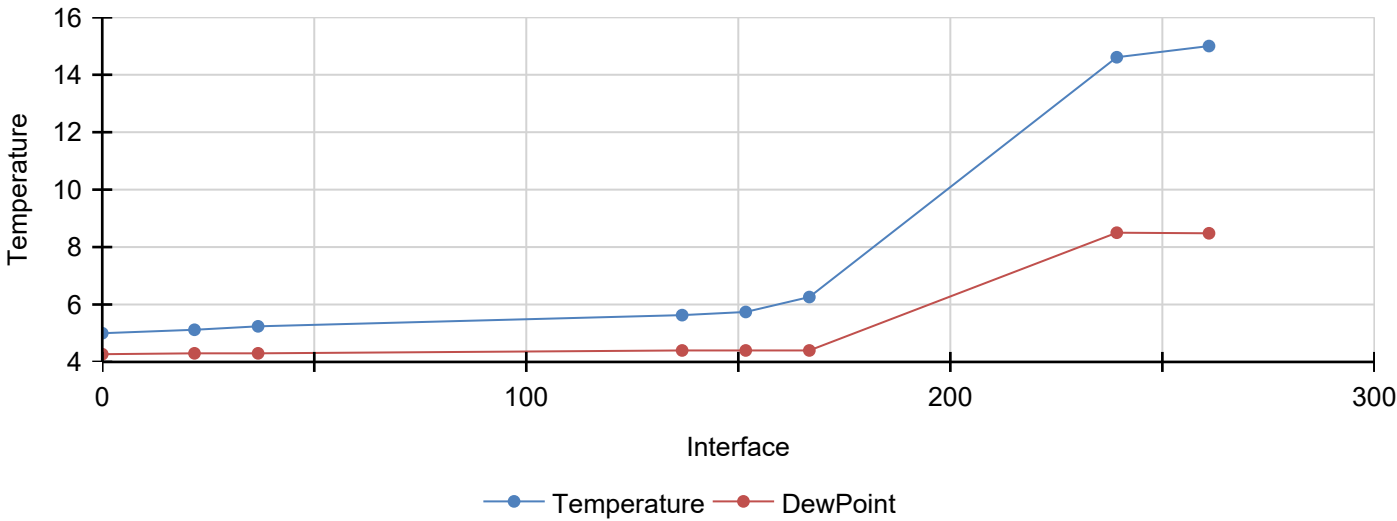
Vapour pressure table

Interface - between layers	Interface temp. °C	Vapour pressure Pa	Satur. vapour pressure Pa	Dew point °C	Cond. rate g/m² h	Cond. rate 60 days g/m² h	Cond. risk Y/N
External surface	5.00	828.3	871.9	4.27	0.00	0.00	No
1. External surface / Plaster, standard	5.12	828.3	879.3	4.3	0.00	0.00	No
2. Plaster, standard / Brick, outer leaf	5.24	829.1	886.3	4.3	0.00	0.00	No
3. Brick, outer leaf / Plaster, standard	5.63	833.6	910.9	4.4	0.00	0.00	No
4. Plaster, standard / airspace/plaster dabs	5.74	834.5	918.1	4.4	0.00	0.00	No
5. airspace/plaster dabs / Celotex PL4060 [72.5mm]	6.26	834.5	951.5	4.4	0.00	0.00	No
Celotex PL4060 [72.5mm] / Internal surface	14.61	1107.9	1661.6	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1661.6	8.48	0.00	0.00	No



Interface temperature / Dew point graphical representation

CONDENSATION RISK ANALYSIS



CONDENSATION RISK ANALYSIS

Wall - 000004

Environmental conditions

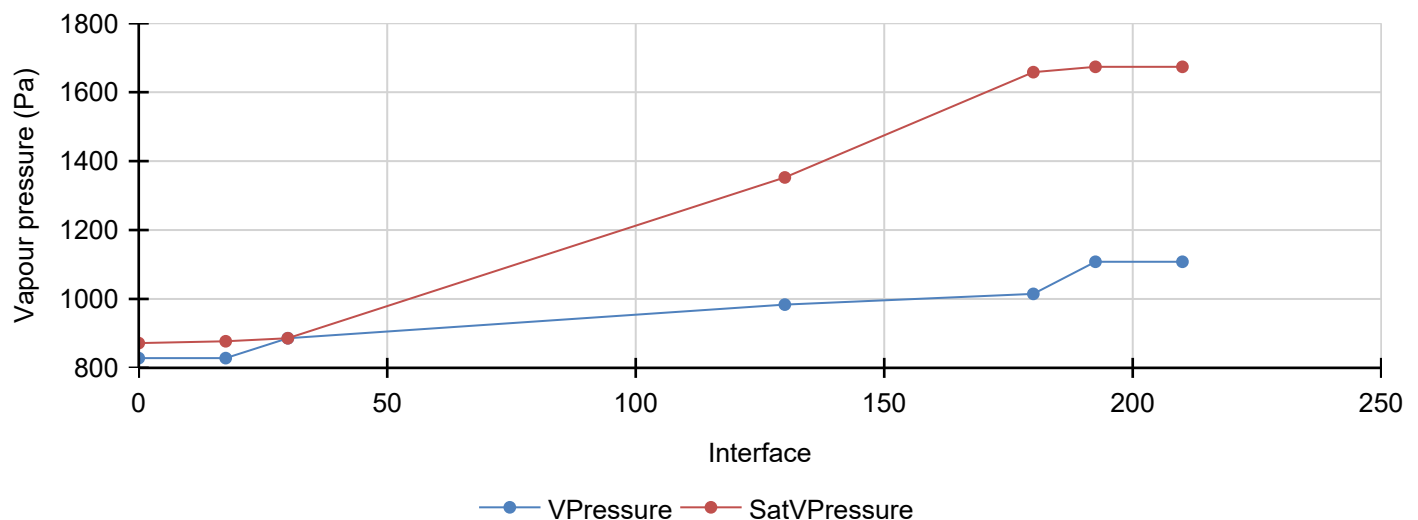
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

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.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	0.1058	60.0	0.75	0.75
2.ROCKWOOL RWA45 slab	100.0	0.0350	2.8571	2.9629	5.0	0.50	1.25
3.ROCKWOOL RWA45 slab	50.0	0.0350	1.4286	4.3915	5.0	0.25	1.50
4.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	4.4573	60.0	0.75	2.25
Internal surface	-	0.0000	0.1300	4.4573	0.0	0.00	2.25

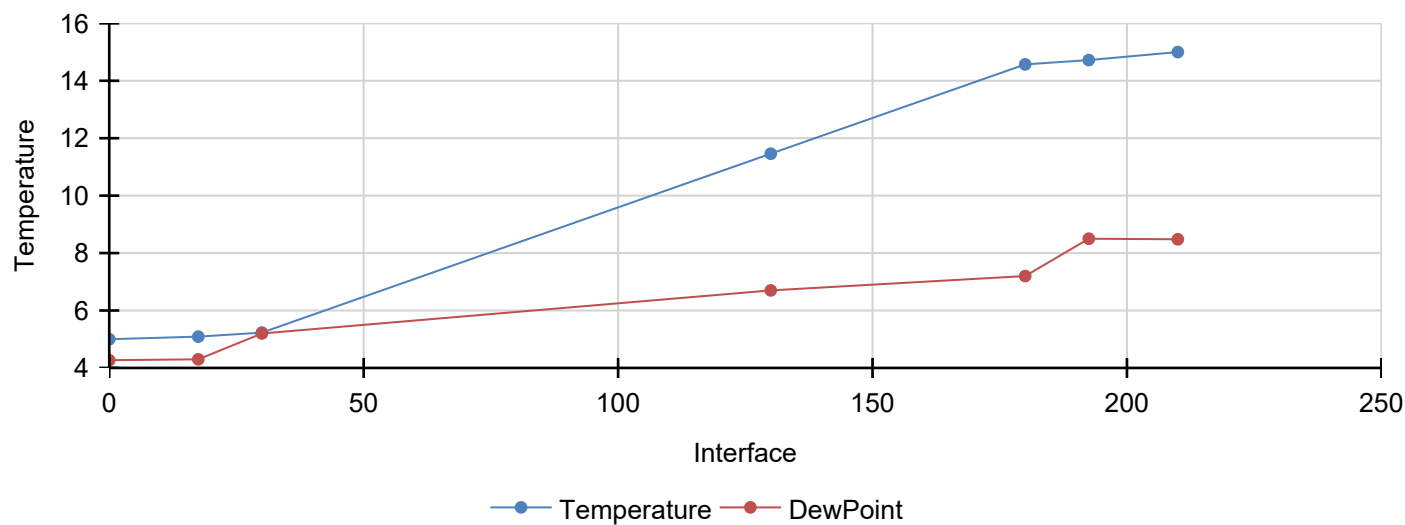
Vapour pressure table

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 / Gyproc Wallboard (12.5mm)	5.09	828.3	877.2	4.3	0.00	0.00	No
2. Gyproc Wallboard (12.5mm) / ROCKWOOL RWA45 slab	5.23	886.0	886.0	5.2	0.26	367.76	Yes
3. ROCKWOOL RWA45 slab / ROCKWOOL RWA45 slab	11.46	983.6	1352.6	6.7	0.00	0.00	No
4. ROCKWOOL RWA45 slab / Gyproc Wallboard (12.5mm)	14.57	1014.7	1658.1	7.2	0.00	0.00	No
Gyproc Wallboard (12.5mm) / Internal surface	14.72	1107.9	1673.6	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1673.6	8.48	0.00	0.00	No



Interface temperature / Dew point graphical representation

CONDENSATION RISK ANALYSIS



CONDENSATION RISK ANALYSIS

Floor - 000003

Environmental conditions

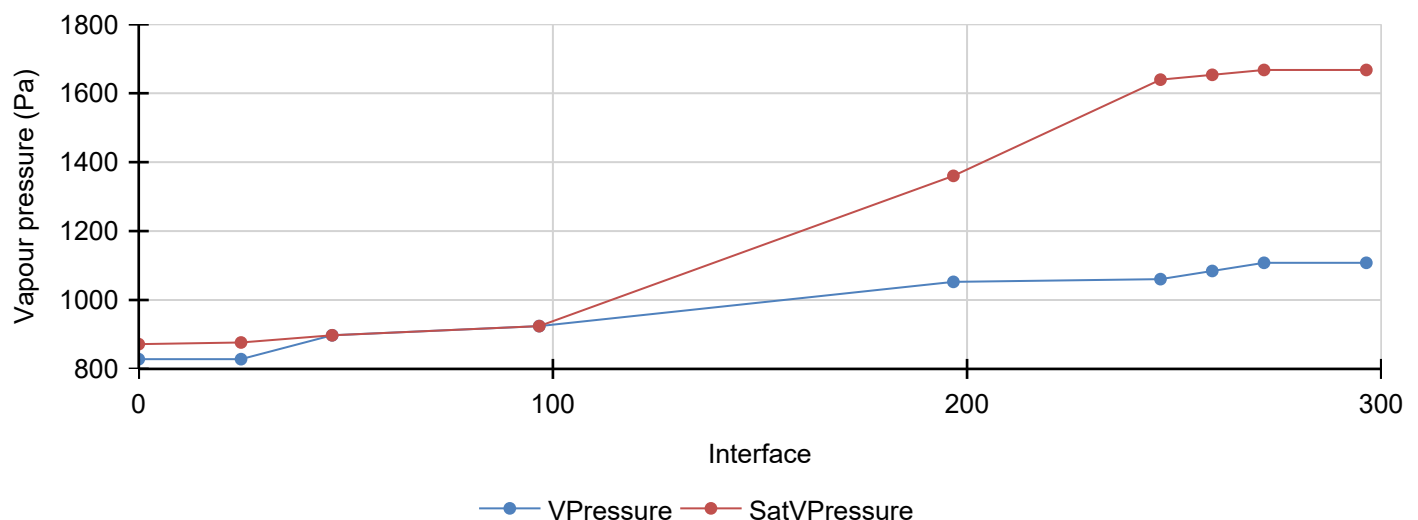
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance m².K/W	Cumulative thermal resistance m².K/W	Vapour resistivity GN.s/kg.m	Vapour resistance GN.s/kg.m	Cumulative vapour resistance GN.s/kg.m
External surface	-	0.0000	0.0400	0.0400	0.0	0.00	0.00
1.Chipboard	22.0	0.1300	0.1692	0.2092	300.0	6.60	6.60
2.Standard cavity	50.0	0.0000	0.2100	0.4192	0.0	0.00	6.60
3.ROCKWOOL RWA45 slab	100.0	0.0350	2.8571	3.2764	5.0	0.50	7.10
4.ROCKWOOL RWA45 slab	50.0	0.0350	1.4286	4.7049	5.0	0.25	7.35
5.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	4.7707	60.0	0.75	8.10
6.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	4.8365	60.0	0.75	8.85
Internal surface	-	0.0000	0.1700	4.8365	0.0	0.00	8.85

Vapour pressure table

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



Interface temperature / Dew point graphical representation

