

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.60

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Project Information:

Assessed By: Liam Mason (STRO033679)

Building Type: Flat

Dwelling Details:

NEW DWELLING AS BUILT

Total Floor Area: 69.97m²

Site Reference : Willingale Road

Plot Reference: 04-19-75435 PL1 P7 (apt)

Address : 3 Middleton Court, 90 Willingale Road, Loughton, IG10 2DA

Client Details:

Name: Galldris Group

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 21.57 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 19.92 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 65.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 51.2 kWh/m² **OK**

2 Fabric U-values

Element	Average	Highest	
External wall	0.17 (max. 0.30)	0.17 (max. 0.70)	OK
Floor	(no floor)		
Roof	0.18 (max. 0.20)	0.18 (max. 0.35)	OK
Openings	1.29 (max. 2.00)	1.30 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	2.20	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:	Database: (rev 512, product index 018907): Boiler systems with radiators or underfloor heating - mains gas Brand name: Worcester Model: Greenstar 4000 Model qualifier: GR4700iW 30 C NG (Combi) Efficiency 89.3 % SEDBUK2009 Minimum 88.0 %	OK
Secondary heating system:	None	

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Programmer, room thermostat and TRVs **OK**

Hot water controls: No cylinder thermostat

No cylinder

Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%

Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power: 0.16 0.18

Maximum 0.7 **OK**

9 Summertime temperature

Overheating risk (Thames valley): Not significant **OK**

Based on:

Overshading: Average or unknown

Windows facing: North West 7.72m²

Windows facing: South East 5.35m²

Ventilation rate: 6.00

Blinds/curtains: Dark-coloured curtain or roller blind

Closed 100% of daylight hours

10 Key features

Air permeability 2.2 m³/m²h

SAP Input

Property Details: 04-19-75435 PL1 P7 (apt)

Address: 3 Middleton Court, 90 Willingale Road, Loughton, IG10 2DA
 Located in: England
 Region: Thames valley
 UPRN:
 Date of assessment: 09 September 2024
 Date of certificate: 09 September 2024
 Assessment type: New dwelling as built
 Transaction type: New dwelling
 Tenure type: Unknown
 Related party disclosure: No related party
 Thermal Mass Parameter: Indicative Value Medium
 Water use <= 125 litres/person/day: True
 PCDF Version: 512

Property description:

Dwelling type: Flat
 Detachment:
 Year Completed: 2024
 Floor Location: Floor area: Storey height:
 Floor 0 69.97 m² 2.4 m
 Living area: 26.13 m² (fraction 0.373)
 Front of dwelling faces: North East

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
Entrance	Manufacturer	Solid			PVC-U
Front	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Rear	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood

Name:	Gap:	Frame Factor:	g-value:	U-value:	Area:	No. of Openings:
Entrance	mm	0.7	0	1.2	2.01	1
Front	16mm or more	0.7	0.63	1.3	7.72	1
Rear	16mm or more	0.7	0.63	1.3	5.35	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
Entrance		Corridor	North West	0	0
Front		Weatherboard clad	North West	0	0
Rear		Weatherboard clad	South East	0	0

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
<u>External Elements</u>							
Weatherboard clad	66.59	13.07	53.52	0.17	0	False	N/A
Corridor	14.54	2.01	12.53	0.16	0	False	N/A
Roof	69.97	0	69.97	0.18	0		N/A
<u>Internal Elements</u>							
Internal wall	142						N/A
<u>Party Elements</u>							
Party floor	69.97						N/A

Thermal bridges:

SAP Input

Thermal bridges:	User-defined (individual PSI-values) Y-Value = 0.1059			
	Length	Psi-value		
[Approved]	7.07	0.3	E2	Other lintels (including other steel lintels)
[Approved]	0.57	0.04	E3	Sill
[Approved]	24.36	0.05	E4	Jamb
[Approved]	33.52	0.07	E7	Party floor between dwellings (in blocks of flats)
[Approved]	10.08	0.09	E16	Corner (normal)
	33.52	0.28	E15	Flat roof with parapet

Ventilation:

Pressure test:	Yes (As built)
Ventilation:	Decentralised whole house extract
	Number of fans in Wetroom: Kitchen 1 Other 1
	Ductwork: ,
	Approved Installation Scheme: True
Number of chimneys:	0
Number of open flues:	0
Number of fans:	0
Number of passive stacks:	0
Number of sides sheltered:	3
Pressure test:	2.2 (Assessed dwelling is tested)

Main heating system:

Main heating system:	Boiler systems with radiators or underfloor heating
	Gas boilers and oil boilers
	Fuel: mains gas
	Info Source: Boiler Database
	Database: (rev 512, product index 018907) Efficiency: Winter 87.6 % Summer: 90.2
	Brand name: Worcester
	Model: Greenstar 4000
	Model qualifier: GR4700iW 30 C NG
	(Combi boiler)
	Systems with radiators
	Central heating pump : 2013 or later
	Design flow temperature: Unknown
	Room-sealed
	Boiler interlock: Yes
	Delayed start

Main heating Control:

Main heating Control:	Programmer, room thermostat and TRVs
	Control code: 2106

Secondary heating system:

Secondary heating system:	None
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Water heating:

Water heating:	From main heating system
	Water code: 901
	Fuel :mains gas
	No hot water cylinder
	Solar panel: False

Others:

Electricity tariff:	Standard Tariff
In Smoke Control Area:	Unknown
Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Low rise urban / suburban
EPC language:	English

SAP Input

Wind turbine:	No
Photovoltaics:	None
Assess Zero Carbon Home:	No

SAP WorkSheet: New dwelling as built

Adjusted infiltration rate (allowing for shelter and wind speed) = (21a) x (22a)m

0.11	0.11	0.1	0.09	0.09	0.08	0.08	0.08	0.09	0.09	0.1	0.1
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Calculate effective air change rate for the applicable case

If mechanical ventilation:

0.5 (23a)

If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)) , otherwise (23b) = (23a)

0.5 (23b)

If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =

0 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) x [1 - (23c) ÷ 100]

(24a)m=

0	0	0	0	0	0	0	0	0	0	0	0
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 (24a)

b) If balanced mechanical ventilation without heat recovery (MV) (24b)m = (22b)m + (23b)

(24b)m=

0	0	0	0	0	0	0	0	0	0	0	0
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 (24b)

c) If whole house extract ventilation or positive input ventilation from outside

if (22b)m < 0.5 x (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 x (23b)

(24c)m=

0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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 (24c)

d) If natural ventilation or whole house positive input ventilation from loft

if (22b)m = 1, then (24d)m = (22b)m otherwise (24d)m = 0.5 + [(22b)m² x 0.5]

(24d)m=

0	0	0	0	0	0	0	0	0	0	0	0
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 (24d)

Effective air change rate - enter (24a) or (24b) or (24c) or (24d) in box (25)

(25)m=

0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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 (25)

3. Heat losses and heat loss parameter:

ELEMENT	Gross area (m ²)	Openings m ²	Net Area A ,m ²	U-value W/m ² K	A X U (W/K)	k-value kJ/m ² -K	A X k kJ/K
Doors			2.01	x 1.2	= 2.412		(26)
Windows Type 1			7.72	x 1/[1/(1.3)+0.04]	= 9.54		(27)
Windows Type 2			5.35	x 1/[1/(1.3)+0.04]	= 6.61		(27)
Walls Type1	66.59	13.07	53.52	x 0.17	= 9.1		(29)
Walls Type2	14.54	2.01	12.53	x 0.16	= 2		(29)
Roof	69.97	0	69.97	x 0.18	= 12.59		(30)
Total area of elements, m ²			151.1				(31)
Party floor			69.97				(32a)
Internal wall **			142				(32c)

* for windows and roof windows, use effective window U-value calculated using formula 1/[1/(U-value)+0.04] as given in paragraph 3.2

** include the areas on both sides of internal walls and partitions

Fabric heat loss, W/K = S (A x U) (26)...(30) + (32) = 42.26 (33)

Heat capacity Cm = S(A x k) ((28)...(30) + (32) + (32a)...(32e) = 8669.53 (34)

Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K Indicative Value: Medium 250 (35)

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f can be used instead of a detailed calculation.

Thermal bridges : S (L x Y) calculated using Appendix K 16 (36)

if details of thermal bridging are not known (36) = 0.05 x (31)

Total fabric heat loss (33) + (36) = 58.26 (37)

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

(38)m=

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
27.71	27.71	27.71	27.71	27.71	27.71	27.71	27.71	27.71	27.71	27.71	27.71

 (38)

Heat transfer coefficient, W/K (39)m = (37) + (38)m

(39)m=

85.97	85.97	85.97	85.97	85.97	85.97	85.97	85.97	85.97	85.97	85.97	85.97
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 (39)

SAP WorkSheet: New dwelling as built

Heat loss parameter (HLP), W/m²K

(40)m = (39)m ÷ (4)

(40)m=	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	
Average = Sum(40) _{1...12} / 12 =												1.23	

Number of days in month (Table 1a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement:

kWh/year:

Assumed occupancy, N 2.25 (42)

if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA - 13.9)²)] + 0.0013 x (TFA - 13.9)

if TFA ≤ 13.9, N = 1

Annual average hot water usage in litres per day Vd,average = (25 x N) + 36 87.53 (43)

Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more than 125 litres per person per day (all water use, hot and cold)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)													
(44)m=	96.28	92.78	89.28	85.78	82.28	78.78	78.78	82.28	85.78	89.28	92.78	96.28	
Total = Sum(44) _{1...12} =												1050.34	

Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(45)m=	142.78	124.88	128.86	112.35	107.8	93.02	86.2	98.91	100.1	116.65	127.33	138.28	
Total = Sum(45) _{1...12} =												1377.16	

If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61)

(46)m= 21.42 18.73 19.33 16.85 16.17 13.95 12.93 14.84 15.01 17.5 19.1 20.74 (46)

Water storage loss:

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

If community heating and no tank in dwelling, enter 110 litres in (47)

Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47)

Water storage loss:

a) If manufacturer's declared loss factor is known (kWh/day): 0 (48)

Temperature factor from Table 2b 0 (49)

Energy lost from water storage, kWh/year (48) x (49) = 0 (50)

b) If manufacturer's declared cylinder loss factor is not known:

Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51)

If community heating see section 4.3

Volume factor from Table 2a 0 (52)

Temperature factor from Table 2b 0 (53)

Energy lost from water storage, kWh/year (47) x (51) x (52) x (53) = 0 (54)

Enter (50) or (54) in (55) 0 (55)

Water storage loss calculated for each month (56)m = (55) x (41)m

(56)m= 0 0 0 0 0 0 0 0 0 0 0 0 (56)

If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) - (H11)] ÷ (50), else (57)m = (56)m where (H11) is from Appendix H

(57)m= 0 0 0 0 0 0 0 0 0 0 0 0 (57)

Primary circuit loss (annual) from Table 3 0 (58)

Primary circuit loss calculated for each month (59)m = (58) ÷ 365 x (41)m

(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)

(59)m= 0 0 0 0 0 0 0 0 0 0 0 0 (59)

SAP WorkSheet: New dwelling as built

Combi loss calculated for each month (61)m = (60) ÷ 365 × (41)m

(61)m=	28.44	25.69	28.43	27.51	28.42	27.5	28.42	28.42	27.51	28.43	27.52	28.44	(61)
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Total heat required for water heating calculated for each month (62)m = 0.85 × (45)m + (46)m + (57)m + (59)m + (61)m

(62)m=	171.22	150.57	157.3	139.86	136.22	120.52	114.61	127.33	127.6	145.08	154.85	166.72	(62)
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Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)

(add additional lines if FGHRs and/or WWHRs applies, see Appendix G)

(63)m=	0	0	0	0	0	0	0	0	0	0	0	(63)
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Output from water heater

(64)m=	171.22	150.57	157.3	139.86	136.22	120.52	114.61	127.33	127.6	145.08	154.85	166.72		
												Output from water heater (annual) _{1...12}	(64)	
												1711.89		

Heat gains from water heating, kWh/month $0.25 \times [0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]$

(65)m=	54.59	47.94	49.96	44.23	42.95	37.81	35.76	39.99	40.16	45.89	49.22	53.09	(65)
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include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating

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=	134.72	134.72	134.72	134.72	134.72	134.72	134.72	134.72	134.72	134.72	134.72	134.72	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

(67)m=	44.64	39.65	32.25	24.41	18.25	15.41	16.65	21.64	29.04	36.88	43.04	45.89	(67)
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Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

(68)m=	294.37	297.42	289.73	273.34	252.65	233.21	220.22	217.17	224.87	241.25	261.94	281.38	(68)
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Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

(69)m=	50.72	50.72	50.72	50.72	50.72	50.72	50.72	50.72	50.72	50.72	50.72	50.72	(69)
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Pumps and fans gains (Table 5a)

(70)m=	3	3	3	3	3	3	3	3	3	3	3	3	(70)
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Losses e.g. evaporation (negative values) (Table 5)

(71)m=	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	-89.82	(71)
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Water heating gains (Table 5)

(72)m=	73.37	71.34	67.14	61.43	57.73	52.51	48.07	53.76	55.78	61.69	68.36	71.35	(72)
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Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m

(73)m=	511.01	507.05	487.74	457.81	427.26	399.75	383.57	391.19	408.31	438.44	471.97	497.25	(73)
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6. Solar gains:

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientation:	Access Factor Table 6d	x	Area m ²	x	Flux Table 6a	x	g _g Table 6b	x	FF Table 6c	=	Gains (W)	
Southeast 0.9x	0.77	x	5.35	x	36.79	x	0.63	x	0.7	=	60.16	(77)
Southeast 0.9x	0.77	x	5.35	x	62.67	x	0.63	x	0.7	=	102.47	(77)
Southeast 0.9x	0.77	x	5.35	x	85.75	x	0.63	x	0.7	=	140.21	(77)
Southeast 0.9x	0.77	x	5.35	x	106.25	x	0.63	x	0.7	=	173.72	(77)
Southeast 0.9x	0.77	x	5.35	x	119.01	x	0.63	x	0.7	=	194.59	(77)

SAP WorkSheet: New dwelling as built

Southeast 0.9x	0.77	x	5.35	x	118.15	x	0.63	x	0.7	=	193.18	(77)
Southeast 0.9x	0.77	x	5.35	x	113.91	x	0.63	x	0.7	=	186.24	(77)
Southeast 0.9x	0.77	x	5.35	x	104.39	x	0.63	x	0.7	=	170.68	(77)
Southeast 0.9x	0.77	x	5.35	x	92.85	x	0.63	x	0.7	=	151.82	(77)
Southeast 0.9x	0.77	x	5.35	x	69.27	x	0.63	x	0.7	=	113.25	(77)
Southeast 0.9x	0.77	x	5.35	x	44.07	x	0.63	x	0.7	=	72.06	(77)
Southeast 0.9x	0.77	x	5.35	x	31.49	x	0.63	x	0.7	=	51.48	(77)
Northwest 0.9x	0.77	x	7.72	x	11.28	x	0.63	x	0.7	=	26.62	(81)
Northwest 0.9x	0.77	x	7.72	x	22.97	x	0.63	x	0.7	=	54.19	(81)
Northwest 0.9x	0.77	x	7.72	x	41.38	x	0.63	x	0.7	=	97.63	(81)
Northwest 0.9x	0.77	x	7.72	x	67.96	x	0.63	x	0.7	=	160.33	(81)
Northwest 0.9x	0.77	x	7.72	x	91.35	x	0.63	x	0.7	=	215.52	(81)
Northwest 0.9x	0.77	x	7.72	x	97.38	x	0.63	x	0.7	=	229.76	(81)
Northwest 0.9x	0.77	x	7.72	x	91.1	x	0.63	x	0.7	=	214.94	(81)
Northwest 0.9x	0.77	x	7.72	x	72.63	x	0.63	x	0.7	=	171.35	(81)
Northwest 0.9x	0.77	x	7.72	x	50.42	x	0.63	x	0.7	=	118.96	(81)
Northwest 0.9x	0.77	x	7.72	x	28.07	x	0.63	x	0.7	=	66.22	(81)
Northwest 0.9x	0.77	x	7.72	x	14.2	x	0.63	x	0.7	=	33.5	(81)
Northwest 0.9x	0.77	x	7.72	x	9.21	x	0.63	x	0.7	=	21.74	(81)

Solar gains in watts, calculated for each month

(83)m = Sum(74)m ... (82)m

(83)m=	86.78	156.66	237.83	334.05	410.1	422.94	401.18	342.03	270.77	179.47	105.55	73.22	(83)
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Total gains – internal and solar (84)m = (73)m + (83)m , watts

(84)m=	597.79	663.71	725.58	791.87	837.36	822.69	784.75	733.22	679.09	617.92	577.52	570.47	(84)
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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85)

Utilisation factor for gains for living area, h1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(86)m=	0.99	0.98	0.97	0.92	0.81	0.63	0.47	0.53	0.77	0.94	0.98	0.99	(86)

Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)

(87)m=	19.88	20.03	20.28	20.59	20.84	20.96	20.99	20.99	20.9	20.59	20.17	19.84	(87)
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Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)

(88)m=	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	(88)
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Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)

(89)m=	0.99	0.98	0.96	0.89	0.75	0.54	0.36	0.41	0.68	0.91	0.98	0.99	(89)
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Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)

(90)m=	18.9	19.05	19.29	19.58	19.79	19.88	19.9	19.89	19.85	19.59	19.19	18.86	(90)
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fLA = Living area ÷ (4) =

0.37

 (91)

Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 – fLA) × T2

(92)m=	19.27	19.42	19.66	19.96	20.18	20.28	20.3	20.3	20.24	19.96	19.56	19.22	(92)
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Apply adjustment to the mean internal temperature from Table 4e, where appropriate

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(93)m=	19.12	19.27	19.51	19.81	20.03	20.13	20.15	20.15	20.09	19.81	19.41	19.07	(93)
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8. Space heating requirement

Set T_i to the mean internal temperature obtained at step 11 of Table 9b, so that $T_{i,m}=(76)m$ and re-calculate the utilisation factor for gains using Table 9a

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Utilisation factor for gains, h_m :

(94)m=	0.99	0.98	0.95	0.89	0.76	0.56	0.39	0.43	0.7	0.91	0.97	0.99	(94)
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Useful gains, $h_m G_m$, $W = (94)m \times (84)m$

(95)m=	589.08	647.36	690.29	703.5	633.52	460.37	303.52	318.93	473.38	563.22	562.42	563.67	(95)
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Monthly average external temperature from Table 8

(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)
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Heat loss rate for mean internal temperature, L_m , $W = [(39)m \times ((93)m - (96)m)]$

(97)m=	1274.1	1235.18	1118.46	937.53	716.41	475.75	305.61	322.56	515.2	791.76	1057.87	1278.78	(97)
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Space heating requirement for each month, $kWh/month = 0.024 \times [(97)m - (95)m] \times (41)m$

(98)m=	509.66	395.01	318.56	168.5	61.67	0	0	0	0	170.03	356.72	532.04	
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Total per year (kWh/year) = $Sum(98)_{1..5,9..12} =$ 2512.19 (98)

Space heating requirement in $kWh/m^2/year$ 35.9 (99)

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

Space heating:

Fraction of space heat from secondary/supplementary system 0 (201)

Fraction of space heat from main system(s) (202) = 1 - (201) = 1 (202)

Fraction of total heating from main system 1 (204) = (202) × [1 - (203)] = 1 (204)

Efficiency of main space heating system 1 90.2 (206)

Efficiency of secondary/supplementary heating system, % 0 (208)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/year
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Space heating requirement (calculated above)

509.66	395.01	318.56	168.5	61.67	0	0	0	0	170.03	356.72	532.04
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(211)m = $\{[(98)m \times (204)]\} \times 100 \div (206)$ (211)

565.03	437.93	353.17	186.81	68.37	0	0	0	0	188.51	395.48	589.85
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Total (kWh/year) = $Sum(211)_{1..5,10..12} =$ 2785.14 (211)

Space heating fuel (secondary), $kWh/month$

= $\{[(98)m \times (201)]\} \times 100 \div (208)$

(215)m=	0	0	0	0	0	0	0	0	0	0	0	
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Total (kWh/year) = $Sum(215)_{1..5,10..12} =$ 0 (215)

Water heating

Output from water heater (calculated above)

171.22	150.57	157.3	139.86	136.22	120.52	114.61	127.33	127.6	145.08	154.85	166.72
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Efficiency of water heater 87.6 (216)

(217)m= (217)

89.53	89.47	89.32	89	88.39	87.6	87.6	87.6	87.6	88.98	89.4	89.57
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Fuel for water heating, $kWh/month$

(219)m = $(64)m \times 100 \div (217)m$

(219)m=	191.24	168.29	176.1	157.14	154.11	137.58	130.84	145.36	145.66	163.04	173.22	186.14	
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Total = $Sum(219a)_{1..12} =$ 1928.73 (219)

Annual totals

Space heating fuel used, main system 1 kWh/year 2785.14 kWh/year

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Water heating fuel used		1928.73
Electricity for pumps, fans and electric keep-hot		
mechanical ventilation - balanced, extract or positive input from outside	43.71	(230a)
central heating pump:	30	(230c)
boiler with a fan-assisted flue	45	(230e)
Total electricity for the above, kWh/year	sum of (230a)...(230g) =	118.71 (231)
Electricity for lighting		315.38 (232)
Total delivered energy for all uses (211)...(221) + (231) + (232)...(237b) =		5147.95 (338)

10a. Fuel costs - individual heating systems:

	Fuel kWh/year		Fuel Price (Table 12)		Fuel Cost £/year
Space heating - main system 1	(211) x		3.48	x 0.01 =	96.92 (240)
Space heating - main system 2	(213) x		0	x 0.01 =	0 (241)
Space heating - secondary	(215) x		13.19	x 0.01 =	0 (242)
Water heating cost (other fuel)	(219)		3.48	x 0.01 =	67.12 (247)
Pumps, fans and electric keep-hot	(231)		13.19	x 0.01 =	15.66 (249)
(if off-peak tariff, list each of (230a) to (230g) separately as applicable and apply fuel price according to Table 12a					
Energy for lighting	(232)		13.19	x 0.01 =	41.6 (250)
Additional standing charges (Table 12)					120 (251)
Appendix Q items: repeat lines (253) and (254) as needed					
Total energy cost		(245)...(247) + (250)...(254) =			341.3 (255)

11a. SAP rating - individual heating systems

Energy cost deflator (Table 12)		0.42 (256)
Energy cost factor (ECF)	[(255) x (256)] ÷ [(4) + 45.0] =	1.25 (257)
SAP rating (Section 12)		82.61 (258)

12a. CO2 emissions – Individual heating systems including micro-CHP

	Energy kWh/year		Emission factor kg CO2/kWh		Emissions kg CO2/year
Space heating (main system 1)	(211) x		0.216	=	601.59 (261)
Space heating (secondary)	(215) x		0.519	=	0 (263)
Water heating	(219) x		0.216	=	416.6 (264)
Space and water heating		(261) + (262) + (263) + (264) =			1018.19 (265)
Electricity for pumps, fans and electric keep-hot	(231) x		0.519	=	61.61 (267)
Electricity for lighting	(232) x		0.519	=	163.68 (268)
Total CO2, kg/year		sum of (265)...(271) =			1243.48 (272)
CO2 emissions per m²		(272) ÷ (4) =			17.77 (273)

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El rating (section 14)

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(274)

13a. Primary Energy

	Energy kWh/year	Primary factor	=	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	=	3397.87 (261)
Space heating (secondary)	(215) x	3.07	=	0 (263)
Energy for water heating	(219) x	1.22	=	2353.05 (264)
Space and water heating	(261) + (262) + (263) + (264) =			5750.91 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	364.43 (267)
Electricity for lighting	(232) x	0	=	968.21 (268)
'Total Primary Energy		sum of (265)...(271) =		7083.55 (272)
Primary energy kWh/m²/year		(272) ÷ (4) =		101.24 (273)

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 09 September 2024

Property Details: 04-19-75435 PL1 P7 (apt)

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	Yes
Number of storeys:	1
Front of dwelling faces:	North East
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Medium
Night ventilation:	False
Blinds, curtains, shutters:	Dark-coloured curtain or roller blind
Ventilation rate during hot weather (ach):	6 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	332.5	(P1)
Transmission heat loss coefficient:	58.3	
Summer heat loss coefficient:	390.76	(P2)

Overhangs:

Orientation:	Ratio:	Z_overhangs:
North West (Front)	0	1
South East (Rear)	0	1

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
North West (Front)	0.85	0.9	1	0.76	(P8)
South East (Rear)	0.85	0.9	1	0.76	(P8)

Solar gains:

Orientation	Area	Flux	g_	FF	Shading	Gains	
North West (Front)	0.9 x	7.72	98.85	0.63	0.76	231.69	
South East (Rear)	0.9 x	5.35	119.92	0.63	0.76	194.8	
					Total	426.5	(P3/P4)

Internal gains:

	June	July	August	
Internal gains	396.75	380.57	388.19	
Total summer gains	851.37	807.06	759.47	(P5)
Summer gain/loss ratio	2.18	2.07	1.94	(P6)
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	0.25	0.25	0.25	
Threshold temperature	18.43	20.22	19.99	(P7)
Likelihood of high internal temperature	Not significant	Not significant	Not significant	

Assessment of likelihood of high internal temperature: Not significant