Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.8 Printed on 07 October 2020 at 14:37:25

Project Information:

Assessed By: John Ashe (STRO031268) **Building Type:**

Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Site Reference : COPPETTS WOOD, London

Plot Reference: Unit 39 - COPPETTS WOOD, Lo

Total Floor Area: 53.56m²

Address:

Client Details:

Name: 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 (c), Mains gas (c)

Fuel factor: 1.00 (mains gas (c), mains gas (c))

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

Dwelling Carbon Dioxide Emission Rate (DER) 11.52 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 43.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 41.0 kWh/m²

OK

2 Fabric U-values

Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Floor (no floor) Roof OK

0.13 (max. 0.20) 0.13 (max. 0.35) **Openings** 0.90 (max. 2.00) 0.90 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated using user-specified y-value of 0.15

3 Air permeability

Air permeability at 50 pascals 5.00 (design value)

OK Maximum 10.0

4 Heating efficiency

Main Heating system: Community heating schemes - mains gas

Community boilers

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Charging system linked to use of community heating,

programmer and at least two room thermostats

Hot water controls: No cylinder thermostat

No cylinder

Stroma FSAP 2012 Version: 1.0.5.8 (SAP 9.92) - http://www.stroma.com

OK

OK

Regulations Compliance Report

7 Low energy lights		
Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK
8 Mechanical ventilation		
Continuous supply and extract system		
Specific fan power:	0.9	
Maximum	1.5	OK
MVHR efficiency:	91%	
Minimum	70%	OK
9 Summertime temperature		
Overheating risk (Thames valley):	Medium	ok
Based on:		
Overshading:	Average or unknown	
Windows facing: West	8.95m²	
Ventilation rate:	4.00	
10 Key features		
Windows U-value	0.9 W/m²K	
Community heating, heat from boilers – mains gas		

Photovoltaic array

Thermal Bridge Report

Property Details: Unit 39 - COPPETTS WOOD, London

Address:

Located in: England Region: Thames valley

Thermal bridges:

Thermal bridges: No information on thermal bridging (y=0.15) (y=0.15)

Predicted Energy Assessment



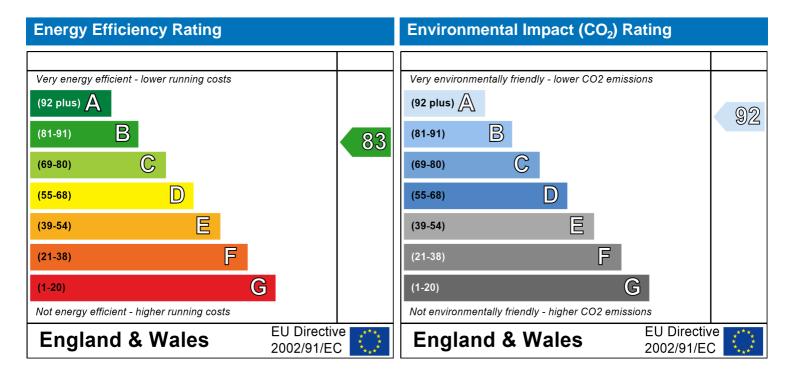
Dwelling type:
Date of assessment:
Produced by:

Top floor Flat 30 September 2020 John Ashe

Produced by: John Ash Total floor area: 53.56 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.



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.

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.

Developer Confirmation Report

Property Details: Unit 39 - COPPETTS WOOD, London

Address:

Located in: England Region: Thames valley

UPRN:

Date of assessment: 30 September 2020 Date of certificate: 07 October 2020

Assessment type: New dwelling design stage

Transaction type: New dwelling

Thermal Mass Parameter: Indicative Value Low

Comments:

Property description:

Dwelling type: Flat

Detachment:

Year Completed: 2020 Front of dwelling faces: North

Comments:

Opening types:

Name: Type: Frame Factor: g-value: U-Value: Area: Left Windows Windows 0.7 0.63 0.9 8.95

Overshading: Average or unknown

Comments:

Opaque Elements:

Type: U-Value: Kappa:

External Elements

Walls
0.15 Please provide the U-Value calculation to justify the U-Value entered into the assessment.

N/A
Flat
0.13 Please provide the U-Value calculation to justify the U-Value entered into the assessment.

N/A

Internal Elements (Area, Kappa)
Party Elements (Area, Kappa)

Thermal bridges:

Developer Confirmation Report

Thermal bridges: Comments:	No information on thermal bridging ($y=0.15$) ($y=0.15$)
If specific construction details have	been adopted then please provide the associated checklists; signed and dated.
Ventilation:	
Pressure test: Ventilation:	Yes (As designed) Balanced with heat recovery Number of wet rooms: Kitchen + 2 Ductwork: Insulation, rigid Approved Installation Scheme: True
Pressure test: Comments:	5
Please provide the pressure test ce	rtificate, or certificates if the result is based on an average; signed and dated.
Main heating system:	
Main heating system:	Community heating schemes Heat source: Community boilers heat from boilers – mains gas, heat fraction 0.4, efficiency 89 Heat source: Community boilers heat from boilers – mains gas, heat fraction 0.4, efficiency 89 Piping>=1991, pre-insulated, low temp, variable flow
Comments:	
Main heating Control:	
Main heating Control:	Charging system linked to use of community heating, programmer and at least two room thermostats
Comments:	
Carandamahashin masakan	
Secondary heating system: Secondary heating system: Comments:	None

Developer Confirmation Report

Water heating:	
Water heating: Comments:	No hot water cylinder
	Solar panel: False
Others:	Soldi pariet. Laise
Electricity tariff: Low energy lights: Terrain type: Wind turbine: Photovoltaics: Comments: Please provide the MCS certi	Standard Tariff 100% Low rise urban / suburban No Photovoltaic 1 Installed Peak power: 0.6051744 Tilt of collector: 30° Overshading: None or very little Collector Orientation: South ficate or data sheet equivalent confirming the size of the array on the roof. This should upport a proportioned amount included in the assessment.
include any calculations to se	apport a proportioned amount included in the assessment.
Declaration :	
I confirm that the property has Signed:	been built to the above specification.
 Nate:	

		User D	etails:						
Assessor Name:	John Ashe		Strom	a Num	her:		STRO	031268	
Software Name:	Stroma FSAP 2012		Softwa					on: 1.0.5.8	
		Property .	Address	Unit 39	- COPF	PETTS V	VOOD, L	ondon.	
Address :									
1. Overall dwelling dime	ensions:								
Ground floor			a(m²)	(4-)		ight(m)	7(0-)	Volume(m³	<u>-</u>
			3.56	(1a) x	2	.66	(2a) =	142.47	(3a)
Total floor area TFA = (1:	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 5	53.56	(4)					
Dwelling volume				(3a)+(3b)+(3c)+(3c	d)+(3e)+	(3n) =	142.47	(5)
2. Ventilation rate:									
	main seconda heating heating	ıry	other		total			m³ per hou	r
Number of chimneys	0 + 0	+	0] = [0	X	40 =	0	(6a)
Number of open flues	0 + 0	+	0] = [0	X	20 =	0	(6b)
Number of intermittent fa	ns			Ī	0	X	10 =	0	(7a)
Number of passive vents				Ē	0	x	10 =	0	(7b)
Number of flueless gas fi	res			F	0	x	40 =	0	(7c)
_				_					
							Air ch	anges per ho	our
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+$	(7a)+(7b)+(7c) =	Γ	0		÷ (5) =	0	(8)
	een carried out or is intended, proce	ed to (17), o	otherwise (continue fr	om (9) to	(16)			٦
Number of storeys in the Additional infiltration	ne aweiling (ns)					[(0)	-1]x0.1 =	0	(9) (10)
	.25 for steel or timber frame o	or 0.35 fo	r masoni	v constr	uction	[(3)	1]XO.1 =	0	(11)
	resent, use the value corresponding			•					` ′
deducting areas of openir	ngs); if equal user 0.35 floor, enter 0.2 (unsealed) or (വ (മേവം	معام (امد	antar N				0	7(12)
If no draught lobby, en	,	7.1 (Seale	<i>ou)</i> , else	enter o				0	(12)
•	s and doors draught stripped							0	(14)
Window infiltration	3 11		0.25 - [0.2	x (14) ÷ 1	00] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	2) + (13)	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cubic metr	es per ho	our per s	quare m	etre of e	envelope	area	5	(17)
If based on air permeabil	ity value, then $(18) = [(17) \div 20] +$	(8), otherwi	ise (18) = (16)				0.25	(18)
	es if a pressurisation test has been do	one or a deg	gree air pe	rmeability	is being u	sed		<u> </u>	_
Number of sides sheltere Shelter factor	ed		(20) = 1 -	0.075 x (1	9)1 =			0	(19)
Infiltration rate incorporat	ing shelter factor		(21) = (18		-/1			0.25	(21)
Infiltration rate modified for	_		() (-	(- /				0.25	(21)
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed from Table 7	· I					Į.		
(22)m= 5.1 5	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Mr. 1 F. (20) (20	0)	•	-		•	•	•	•	
Wind Factor $(22a)m = (22a)m = 1.27$ 1.25	2)m ÷ 4 1.23	0.95	0.92	1	1.08	1.12	1.18		
(220)111= 1.21 1.20	1.20 1.1 1.00 0.95	1 0.95	1 0.92	'	1.08	1.12	1.10		

1	0.31	0.31	0.28	0.27	0.24	0.24	(21a) x 0.23	0.25	0.27	0.28	0.29]	
Calculate effe		•	rate for t	he appli	cable ca	se	<u> </u>	<u>I</u>	<u> </u>		<u>!</u>		
If mechanica												0.5	(23
If exhaust air h) = (23a)			0.5	(2:
If balanced with	h heat reco	very: effic	iency in %	allowing f	or in-use f	actor (fron	n Table 4h) =				77.35	(2:
a) If balance						- ` ` 	- ` ` - 	``	 		1 – (23c)) ÷ 100]	
24a)m= 0.43	0.43	0.42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41		(2
b) If balance	ed mecha	anical ve	entilation	without	heat rec	covery (N	ЛV) (24b	m = (22)	2b)m + (2	23b)		1	
24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(2
c) If whole h				•	•				_ ,,				
	n < 0.5 x		<u> </u>	, <u> </u>		· ` `	ŕ	ŕ	· ` ·		1	1	(0
24c)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(2
d) If natural if (22b)r	ventilation $n = 1$, the								0.5]			_	
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change	rate - er	nter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)					
25)m= 0.43	0.43	0.42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41		(2
3. Heat losse	s and he	at loss i	naramete	⊃r.									
ELEMENT	Gros		Openin		Net Ar	ea	U-valı	16	AXU		k-value	e Δ	Χk
	area	-	m	=	A ,r		W/m2		(W/ł	<)	kJ/m²-l		J/K
Vindows					8.95	х1.	/[1/(0.9)+	0.04] =	7.78				(2
Valls	27.4	3	8.95		18.48	3 x	0.15	_ = [2.77				(2
Roof	53.6	1		=									
		'' [0		53.61	X	0.13	=	6.97				(3
otal area of €	elements,		0		53.61 81.04	=	0.13	= [6.97				(3
		, m²		ndow U-va	81.04	1				s given in	paragraph	1 3.2	(3
for windows and * include the area	d roof windo	, m² ows, use e sides of ir	effective wi		81.04	ated using	ı formula 1	I		s given in	paragraph	n 3.2	(3
for windows and * include the area Fabric heat los	I roof windo as on both ss, W/K =	, m² ows, use e sides of ir = S (A x	effective wi		81.04	ated using		I		s given in	paragraph	n 3.2	=
for windows and * include the area Fabric heat los Heat capacity	roof windo as on both ss, W/K = Cm = S(, m² bws, use esides of ir S (A x A x k)	offective with the state of the	ls and pan	81.04 alue calcul	ated using	ı formula 1	/[(1/U-valu) + (32) =					(3
for windows and * include the area Fabric heat los Heat capacity Thermal mass	roof windons on both ses, W/K = Cm = S(a) parameter	, m² bws, use esides of ir S (A x A x k) ter (TMF	effective winternal walk U) P = Cm -	ls and pan	81.04 alue calculitions	lated using	(26)(30)	/[(1/U-valu) + (32) = ((28) Indica	(30) + (32 tive Value:	2) + (32a). : Low	(32e) =	17.52	(3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (
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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. Wa	iter heat	ing ener	rgy requi	rement:								kWh/ye	ear:	
A	رمم مم		NI.										1	(40)
	ied occu A > 13.9		N + 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (T	ΓFA -13.		.8		(42)
if TF	A £ 13.9	9, N = 1			`	·		, , -	·					
			ater usaç hot water							e target o		.83		(43)
		-	person per			-	-	o acriieve	a water us	se largel o	ı			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate			day for ea						СОР		1.01	200		
(44)m=	84.52	81.44	78.37	75.3	72.22	69.15	69.15	72.22	75.3	78.37	81.44	84.52		
										Γotal = Su	n(44) ₁₁₂ =		921.99	(44)
Energy (content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x D	OTm / 3600	kWh/mon	nth (see Ta	ables 1b, 1	c, 1d)		_
(45)m=	125.33	109.62	113.12	98.62	94.63	81.66	75.67	86.83	87.86	102.4	111.77	121.38		
				. ,						Γotal = Su	m(45) ₁₁₂ =		1208.88	(45)
It instant		ater heatıı	ng at point		hot water	storage),	enter 0 ın	boxes (46)) to (61)				Ī	
(46)m=	18.8 storage	16.44	16.97	14.79	14.19	12.25	11.35	13.02	13.18	15.36	16.77	18.21		(46)
	•		includin	n anv so	olar or W	/WHRS	storage	within sa	ame vess	sel		0		(47)
_		,	nd no ta	•			_					0		(11)
	-	_	hot wate		•			, ,	ers) ente	er '0' in (47)			
Water	storage	loss:												
a) If m	anufact	urer's de	eclared l	oss facto	or is kno	wn (kWł	n/day):					0		(48)
Tempe	erature fa	actor fro	m Table	2b								0		(49)
0,			storage					(48) x (49)) =		1	10		(50)
•			eclared of factor fr	-								00	I	(E4)
		-	ee secti		C Z (KVV)	ii/iiti G/GC	iy <i>)</i>				0.	02		(51)
	e factor	_									1.	03		(52)
Tempe	erature fa	actor fro	m Table	2b							0	.6		(53)
Energy	lost fro	m water	storage	, kWh/ye	ear			(47) x (51)	x (52) x (53) =	1.	03		(54)
Enter	(50) or (54) in (5	55)								1.	03		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)r	m				
(56)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinde	er contains	dedicate	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Primar	y circuit	loss (an	nual) fro	m Table	3							0		(58)
	•	•	culated t			59)m = ((58) ÷ 36	65 × (41)	m				-	
(mod	dified by		rom Tab	e H5 if t	here is s	olar wat	er heatir	ng and a	cylinde	r thermo	stat)		•	
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi	loss cal	culated	for each	month (61)m =	(60) ÷ 36	65 × (41))m						
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat re	equired for	water he	eating ca	alculated	l for e	ach month	(62)r	n = 0.85 ×	(45)m +	- (46)m +	(57)m +	(59)m + (61)m	
(62)m= 180.6	61 159.55	168.39	152.11	149.9	135.	15 130.94	142.	1 141.36	157.67	165.27	176.66		(62)
Solar DHW inp	ut calculated	using App	endix G or	Appendix	H (ne	gative quantit	y) (ente	er '0' if no sola	ar contribu	ution to wate	er heating)	'	
(add additio	nal lines if	FGHRS	and/or \	VWHRS	appl	es, see Ap	pend	x G)					
(63)m= 0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output from	water hea	ter											
(64)m= 180.6	61 159.55	168.39	152.11	149.9	135.	15 130.94	142.	1 141.36	157.67	165.27	176.66		_
	-	-				-	(Output from w	ater heat	er (annual)	12	1859.72	(64)
Heat gains f	from water	heating,	kWh/mo	onth 0.2	5 ´[0.	85 × (45)m	ı + (6′	I)m] + 0.8	x [(46)n	n + (57)m	+ (59)m]	
(65)m= 85.9	76.39	81.83	75.59	75.68	69.9	5 69.38	73.0	9 72.01	78.27	79.96	84.58		(65)
include (5	7)m in calc	culation of	of (65)m	only if c	ylinde	er is in the	dwelli	ng or hot w	ater is	from com	munity h	eating	
5. Internal	gains (see	e Table 5	and 5a):									
Metabolic ga	ains (Table	e 5), Wat	ts										
Jai	1 '	Mar	Apr	May	Ju	n Jul	Αι	g Sep	Oct	Nov	Dec		
(66)m= 107.	7 107.7	107.7	107.7	107.7	107	7 107.7	107.	7 107.7	107.7	107.7	107.7		(66)
Lighting gai	ns (calcula	ted in Ap	pendix	L, equat	ion L	or L9a), a	ilso se	e Table 5		-		•	
(67)m= 36.0	8 32.05	26.06	19.73	14.75	12.4	5 13.45	17.4	9 23.47	29.8	34.79	37.08		(67)
Appliances	gains (calc	ulated in	Append	dix L, eq	uatio	n L13 or L1	3a), a	lso see Ta	ıble 5	•		•	
(68)m= 233.5	53 235.96	229.85	216.85	200.44	185.	01 174.71	172.	29 178.39	191.39	207.81	223.23		(68)
Cooking gai	ins (calcula	ted in A	pendix	L, equat	ion L	15 or L15a), also	see Table	5 5	•			
(69)m= 47.5	7 47.57	47.57	47.57	47.57	47.5	7 47.57	47.5	7 47.57	47.57	47.57	47.57		(69)
Pumps and	fans gains	(Table 5	Ба)			•	•	•	•	•		'	
(70)m= 0	0	0	0	0	0	0	0	0	0	0	0		(70)
Losses e.g.	evaporatio	n (negat	ive valu	es) (Tab	le 5)	•	•	•	•	•	•	•	
(71)m= -71.	8 -71.8	-71.8	-71.8	-71.8	-71.	8 -71.8	-71.	8 -71.8	-71.8	-71.8	-71.8		(71)
Water heati	ng gains (T	able 5)				•		•		•			
(72)m= 115.4	45 113.68	109.99	104.98	101.73	97.1	5 93.25	98.2	4 100.01	105.2	111.06	113.68		(72)
Total intern	nal gains =					(66)m + (67)n	n + (68)	m + (69)m +	(70)m + (71)m + (72)	m	ı	
(73)m= 468.5	53 465.15	449.37	425.03	400.38	378.	08 364.88	371.	48 385.35	409.86	437.11	457.46		(73)
6. Solar ga	ins:												
Solar gains a	re calculated	using sola	r flux from	Table 6a	and as	sociated equa	ations to	convert to the	ne applica	able orienta	ion.		
Orientation:			Area			Flux		_ g	_	FF		Gains	
	Table 6d		m²			Table 6a		Table 6b	-	Table 6c		(W)	
West 0.9	0.77	X	8.9)5	x	19.64	x	0.63	x	0.7	=	53.72	(80)
West 0.9	0.77	x	8.9	95	x	38.42	x	0.63	x	0.7	=	105.09	(80)
West 0.9	0.77	X	8.9	95	x	63.27	x	0.63	x	0.7	=	173.07	(80)
West 0.9	0.77	Х	8.9	95	x	92.28	_ x [0.63	x	0.7	=	252.41	(80)
West 0.9	0.77	х	8.9	95	x	113.09	x	0.63	x	0.7	=	309.34	(80)
West 0.9	0.77	x	8.9	95	x	115.77	x	0.63	x [0.7	=	316.66	(80)
West 0.9	0.77	х	8.9)5	x	110.22	x [0.63	x	0.7	=	301.47	(80)
West 0.9	0.77	х	8.9	95	x	94.68	x	0.63	x	0.7	=	258.96	(80)

West	0.9x	0.77	x	8.9	15	x	73	3.59	x		0.63	x	0.7	=	201.28	(80)
West	0.9x	0.77	x	8.9	15	x	45	5.59	×		0.63	x	0.7	=	124.7	(80)
West	0.9x	0.77	x	8.9	15	x	24	1.49	x		0.63	x	0.7	=	66.98	(80)
West	0.9x	0.77	×	8.9	5	x T	16	6.15	x		0.63	_ x _	0.7	=	44.18	(80)
	_					_										_
Solar	gains in	watts, ca	alculated	for eacl	n month				(83)m	= Sı	um(74)m .	(82)m				
(83)m=	53.72	105.09	173.07	252.41	309.34	316	6.66	301.47	258.9	96	201.28	124.7	66.98	44.18]	(83)
Total g	ains – i	nternal a	nd solar	(84)m =	(73)m -	+ (83	3)m ,	watts					•	•	•	
(84)m=	522.25	570.23	622.44	677.43	709.72	694	4.74	666.36	630.4	44	586.63	534.56	504.1	501.64		(84)
7. Me	an inter	nal temp	erature	(heating	season)	·									
			eating p	`			rea fr	om Tah	ole 9	Th′	1 (°C)				21	(85)
•		Ū	ains for l			•			, o o,	• • •	. (•)					
Otiliot	Jan	Feb	Mar	Apr	May	È	lun	Jul	Au	ın	Sep	Oct	Nov	Dec	1	
(86)m=	0.89	0.86	0.8	0.69	0.56	 	.41	0.3	0.33	-	0.51	0.73	0.85	0.9	†	(86)
, ,			I						<u> </u>			0.70	1 0.00	0.0	1	()
			ature in I				— i		r –	-					1	(07)
(87)m=	19.67	19.88	20.21	20.6	20.83	20	0.96	20.99	20.9	8	20.91	20.61	20.11	19.66]	(87)
Temp	erature	during h	eating p	eriods ir	rest of	dwe	elling f	from Ta	ble 9	, Th	n2 (°C)				_	
(88)m=	20.14	20.14	20.15	20.17	20.18	20	0.2	20.2	20.2	2	20.19	20.18	20.17	20.16]	(88)
Utilisa	ation fac	tor for g	ains for r	est of d	welling,	h2,n	n (see	e Table	9a)							
(89)m=	0.88	0.84	0.78	0.66	0.52	r -	.36	0.25	0.27	7	0.46	0.69	0.83	0.89	1	(89)
Moan	intorna	l temper	ature in t	ho rost	of dwalli	na 7	T2 (fo	llow etc	ne 3		in Tahl	0.00			,	
(90)m=	18.38	18.68	19.15	19.69	19.99	-	0.16	20.19	20.1		20.1	19.71	19.04	18.38	1	(90)
(00)	.0.00			.0.00									g area ÷ (4	ļ	0.46	(91)
													J 3 3 3 3 4 (,	0.40	(0.7
			ature (fo							\neg			T	T	1	(00)
(92)m=	18.98	19.24	19.64	20.11	20.38		0.53	20.56	20.5		20.48	20.13	19.54	18.97	J	(92)
		1	ne mean			_				_		•	T 40.54	T 40.07	1	(02)
(93)m=	18.98	19.24	19.64	20.11	20.38	20).53	20.56	20.5	6	20.48	20.13	19.54	18.97		(93)
		ting requ					-1 -1-	. 44 . (T	- 01		· T' /	70)	1		
			ernal ten or gains ι			iea a	at ste	рттот	rabie	90), so tha	t 11,m=(76)m an	a re-cai	culate	
	Jan	Feb	Mar	Apr	May	l ,	lun	Jul	Au	ıa	Sep	Oct	Nov	Dec	1	
Utilisa	L	l	ains, hm	•	way			ou.		9	Oop		1101	1 200	1	
(94)m=	0.86	0.83	0.77	0.66	0.53	0.	.38	0.27	0.3		0.48	0.69	0.81	0.87	1	(94)
Usefu	ıl gains,	hmGm ,	W = (94)	l)m x (84	4)m	!			I	!			!	!	1	
(95)m=	448.69	471.1	476.78	447.84	376.87	264	4.69	180.56	187.7	73	279.25	368.94	410.62	435.52]	(95)
Montl	nly aver	age exte	rnal tem	perature	from Ta	able	8								1	
(96)m=	4.3	4.9	6.5	8.9	11.7	14	4.6	16.6	16.4	4	14.1	10.6	7.1	4.2	1	(96)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm ,	, W =	[(39)m :	x [(93)m-	- (96)m]	•	•	•	
(97)m=	733.63	712.46	649.05	537.14	413.59	273	3.71	182.83	190.7	79	298.14	453.83	599.66	720.99]	(97)
Space	e heatin	g require	ement for	r each n	nonth, k	/Vh/r	month	า = 0.02	24 x [((97)	m – (95)m] x (4	1)m	•	•	
(98)m=	212	162.19	128.17	64.29	27.32		0	0	0		0	63.15	136.11	212.39]	
							·		Т	Total	per year	(kWh/yea	r) = Sum(9	18)15,912 =	1005.63	(98)
Space	e heatin	a reauire	ement in	kWh/m²	/vear										18.78	(99)
-1-00	2 34.11	5 - 4	2 .		, - 											」 ` ′

9b. Energy requirements – Community heating scheme			
This part is used for space heating, space cooling or water heating preference of space heat from secondary/supplementary heating (Table		0	(301)
Fraction of space heat from community system $1 - (301) =$		1	(302)
The community scheme may obtain heat from several sources. The procedure allows		ne latter	
includes boilers, heat pumps, geothermal and waste heat from power stations. See Approximation of heat from Community boilers	openaix C.	0.4	(303a)
Fraction of community heat from heat source 2		0.4	(303b)
Fraction of total space heat from Community boilers	(302) x (303a) =	0.4	(304a)
Fraction of total space heat from community heat source 2	(302) x (303b) =	0.4	(304b)
Factor for control and charging method (Table 4c(3)) for community h	neating system	1	(305)
Distribution loss factor (Table 12c) for community heating system]	1.05	(306)
Space heating	-	kWh/yea	<u>r</u>
Annual space heating requirement		1005.63	╛
Space heat from Community boilers	(98) x (304a) x (305) x (306) =	422.36	(307a)
Space heat from heat source 2	(98) x (304b) x (305) x (306) =	422.36	(307b)
Efficiency of secondary/supplementary heating system in % (from Ta	ble 4a or Appendix E)	0	(308
Space heating requirement from secondary/supplementary system	(98) x (301) x 100 ÷ (308) =	0	(309)
Water heating Annual water heating requirement	[1859.72	7
If DHW from community scheme: Water heat from Community boilers	(64) x (303a) x (305) x (306) =	781.08	(310a)
Water heat from heat source 2	(64) x (303b) x (305) x (306) =	781.08	(310b)
Electricity used for heat distribution	0.01 × [(307a)(307e) + (310a)(310e)] =	24.07	(313)
Cooling System Energy Efficiency Ratio	[0	(314)
Space cooling (if there is a fixed cooling system, if not enter 0)	= (107) ÷ (314) =	0	(315)
Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from outsi	de	195.54	(330a)
warm air heating system fans		0	(330b)
pump for solar water heating		0	(330g)
Total electricity for the above, kWh/year	=(330a) + (330b) + (330g) =	195.54	(331)
Energy for lighting (calculated in Appendix L)		254.88	(332)
Electricity generated by PVs (Appendix M) (negative quantity)		-522.64	(333)
Electricity generated by wind turbine (Appendix M) (negative quantity	·)	0	(334)
10b. Fuel costs – Community heating scheme			
Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year	

(307a) x

Space heating from CHP

17.91

(340a)

x 0.01 =

4.24

		/year	factor	kWh/year	
13b. Primary Energy – Community heati	ng scheme Ene	rav	Primary	P.Energy	
El rating (section 14)	ng achama			92.4	(385)
Dwelling CO2 Emission Rate	(383) ÷ (4) =			10.44	(384)
Total CO2, kg/year	sum of (376)(382) =			559.15	(383)
Energy saving/generation technologies (Item 1	333) to (334) as applicable		0.52 × 0.01 =	-271.25	(380)
CO2 associated with electricity for lighting	ng (332))) x		0.52	= 132.28	(379)
CO2 associated with electricity for pump	s and fans within dwelling (331)	Х	0.52	= 101.49	(378)
Total CO2 associated with space and wa		4) + (375) =		596.63	(376)
CO2 associated with water from immers		er (312) x	0.22	= 0	(375)
CO2 associated with space heating (sec	• •		0	= 0	(374)
Total CO2 associated with community sy		6) + (368)(372)		= 596.63	(373)
Electrical energy for heat distribution	[(313) x		0.52	12.49	(372)
CO2 associated with heat source 2	[(307b)+(310b)] x 10	00 ÷ (367b) x	0.22	= 292.07	(368)
CO2 associated with heat source 1	[(307b)+(310b)] x 10	00 ÷ (367b) x	0.22	= 292.07	(367)
Efficiency of heat source 2 (%)	If there is CHP using two fuels	repeat (363) to ((367b)
CO2 from other sources of space and was Efficiency of heat source 1 (%)	If there is CHP using two fuels		,		(367a)
		rgy /year	Emission factor kg CO2/kWh	kg CO2/year	
12b. CO2 Emissions – Community heati	· ·	· av	Emission factor	Emissians	
SAP rating (section12)				83.27	(358)
Energy cost factor (ECF)	$[(355) \times (356)] \div [(4) + 45.0] =$			1.2	(357)
Energy cost deflator (Table 12)				0.42	(356)
11b. SAP rating - Community heating s	cheme				
Energy saving/generation technologies Total energy cost	= (340a)(342e) + (345)(354) =			281.46	(355)
Additional standing charges (Table 12)				120	(351)
Energy for lighting	(332)		13.19 x 0.01 =	33.62	(350)
Pumps and fans	(331)		13.19 x 0.01 =	25.79	(349)
Water heating from heat source 2	(310b) x		x 0.01 =	33.12	(342b)
Water heating from CHP	(310a) x		4.24 x 0.01 =	33.12	(342a)
Motor hooting from OUD	(2100)		V 0.04		

Efficiency of heat source 2 (%)	If there is CHP using two fuels repeat (363) to (366) for the second	d fuel	89	(367b)
Energy associated with heat source 1	[(307b)+(310b)] x 100 ÷ (367b) x	1.22	=	1649.66	(367)
Energy associated with heat source 2	[(307b)+(310b)] x 100 ÷ (367b) x	1.22	=	1649.66	(368)
Electrical energy for heat distribution	[(313) x		=	73.89	(372)
Total Energy associated with community syste	ems (363)(366) + (368)(372))	=	3373.22	(373)
if it is negative set (373) to zero (unless spe	ecified otherwise, see C7 in Appendix C)	1		3373.22	(373)
Energy associated with space heating (second	dary) (309) x	0	=	0	(374)
Energy associated with water from immersion	heater or instantaneous heater(312) x	1.22	=	0	(375)
Total Energy associated with space and water	r heating (373) + (374) + (375) =			3373.22	(376)
Energy associated with space cooling	(315) x	3.07	=	0	(377)
Energy associated with electricity for pumps a	and fans within dwelling (331)) x	3.07	=	600.31	(378)
Energy associated with electricity for lighting	(332))) x	3.07	=	782.47	(379)
Energy saving/generation technologies Item 1		3.07 × 0.0	1 =	-1604.51	(380)
Total Primary Energy, kWh/year	sum of (376)(382) =			3151.49	(383)

		User D	Details:						
Assessor Name:	John Ashe		Strom	a Num	her:		STRO	031268	
Software Name:	Stroma FSAP 2012		Softwa					n: 1.0.5.8	
		Property	Address	: Unit 39	- COPF	PETTS V	VOOD, L	ondon.	
Address :									
1. Overall dwelling dime	nsions:								
Ground floor		_	a(m²)	(4 =)		ight(m)	7(0-)	Volume(m³	<u>^</u>
			53.56	(1a) x	2	.66	(2a) =	142.47	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e)+(1	n)	53.56	(4)					
Dwelling volume				(3a)+(3b)+(3c)+(3c	d)+(3e)+	(3n) =	142.47	(5)
2. Ventilation rate:									
	main seconda heating heating	ıry	other		total			m³ per hou	r
Number of chimneys	0 + 0	+	0] = [0	X ·	40 =	0	(6a)
Number of open flues	0 + 0	+	0	_ = [0	X	20 =	0	(6b)
Number of intermittent fa	ns	_		Ī	2	X	10 =	20	(7a)
Number of passive vents				Ē	0	x	10 =	0	(7b)
Number of flueless gas fi	res			F	0	x	40 =	0	(7c)
_				L					
							Air ch	anges per ho	our
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+$	(7a)+(7b)+((7c) =	Г	20		÷ (5) =	0.14	(8)
	een carried out or is intended, proce	ed to (17),	otherwise (continue fr	rom (9) to	(16)			٦
Number of storeys in the Additional infiltration	ie aweiling (ns)					[(0)	-1]x0.1 =	0	(9) (10)
	.25 for steel or timber frame o	or 0.35 fo	r masoni	v constr	uction	[(3)	1]X0.1 =	0	(11)
	resent, use the value corresponding			•					` /
deducting areas of openir	ngs); if equal user 0.35 loor, enter 0.2 (unsealed) or (1 (coal	ad) also	ontor O					7(40)
If no draught lobby, en		J. I (Seale	eu), eise	enter 0				0	(12)
•	s and doors draught stripped							0	(14)
Window infiltration	and doors araagm omppou		0.25 - [0.2	x (14) ÷ 1	00] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13)	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cubic metr	es per ho	our per s	quare m	etre of e	envelope	area	5	(17)
If based on air permeabil	ity value, then $(18) = [(17) \div 20] +$	(8), otherw	rise (18) = (16)				0.39	(18)
	s if a pressurisation test has been do	one or a de	gree air pe	rmeability	is being u	sed			_
Number of sides sheltere	d		(20) = 1 -	10 075 v (1	10)1 –			0	(19)
Shelter factor	ing chalter factor		(20) = 13 (21) = (18)		19)] =			1	(20)
Infiltration rate incorporat			(21) = (10) X (20) =				0.39	(21)
Infiltration rate modified for	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	1 1 1	1 001		ООР		1101	1 200	l	
(22)m= 5.1 5	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
		1	ı	1	I	1	I	I	
Wind Factor (22a)m = (22		1	ı					1	
(22a)m= 1.27 1.25	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		

djusted inf. 0.5		0.48	0.43	0.42	0.37	0.37	0.36	0.39	0.42	0.44	0.46]	
Calculate e		-	rate for t	he appli	cable ca	se		ļ					
	nical ventila											0	(2
	ir heat pump	•	,	, ,	,			,	o) = (23a)			0	(2
	with heat reco	•	•	· ·		`		,				0	(2
· —	nced mech	1	1		i		, 	ŕ	 		' ' '	· ÷ 100] 1	(0
24a)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(2
· —	nced mech	1	1				- ^ ` ` - 	í `	 		1	1	(6
4b)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(2
,	e house ex			•	•				F (00h	`			
	o)m < 0.5 >	x (23b), t	tnen (240	(230)	o); otnerv	vise (24	$\frac{\mathbf{C}}{\mathbf{C}} = (22)$	o) m + 0	.5 × (230	0	1 0	1	(2
			ـــــــــا						0	0	0	J	(2
,	al ventilation) b)m = 1, th			•	•				0.51				
24d)m= 0.62		0.61	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.6	0.61]	(2
Effective :	air change	rate - er	11111111111111111111111111111111111111	or (24b	o) or (24	c) or (24	ld) in box	x (25)	!			1	
25)m= 0.62		0.61	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.6	0.61	1	(2
<u> </u>					L			<u> </u>				1	
3. Heat los	ses and he	eat loss p	•										
LEMEN.		ss (m²)	Openin m		Net Ar A ,r		U-val W/m2		A X U (W/ł	()	k-value kJ/m²-l		A X k kJ/K
/indows	aroa	(111)	•••		8.95		/[1/(1.4)+		11.87	, 	NO/III		(2
/alls	27	42	9.05			_							(2
oof	27.4		8.95		18.48	=	0.18	=	3.33			╡	==
	53.6		0		53.61	=	0.13	=	6.97			_	(3
	of elements		- 		81.04		. fa	15/4/11	\.0041-			h 0.0	(3
	and roof wind areas on both					ated using	j iorriula i	/[(I/U-vait	ie)+0.04j a	s given in	ı paragrapı	1 3.2	
abric heat	loss, W/K	= S (A x	U)				(26)(30)) + (32) =				22.16	(3
eat capaci	ty Cm = S	(A x k)						((28).	(30) + (32	2) + (32a).	(32e) =	1108.8	(3
hermal ma	ss parame	eter (TMF	P = Cm ÷	- TFA) ir	n kJ/m²K			Indica	ative Value:	Medium		250	(3
or design ass	essments wh	nere the de	tails of the	construct	ion are no	known pi	recisely the	e indicative	e values of	TMP in T	able 1f		—
	stead of a de												
hermal brid	•	,		• .	•	(4.05	(3
<i>details of the</i> otal fabric	rmal bridging	are not kn	10wn (36) =	= 0.05 x (3	11)			(22)	- (36) =				
		alaulatas	d manthly	,						25\m v (5	\	26.21	(3
	neat loss c	1	r í		1	11	Λ		$1 = 0.33 \times (3)$		1	1	
Jai	+	Mar	Apr	May	Jun 26.74	Jul	Aug	Sep	Oct	Nov	Dec	-	(3
8)m= 29.3		28.88	27.84	27.65	26.74	26.74	26.57	27.09	27.65	28.04	28.45	J	(3
		<u> </u>	1		ı		1		i = (37) + (3		1	1	
	4 55.32	55.1	54.06	53.86	52.95	52.95	52.79	53.3	53.86	54.25	54.67		—— <i>.</i>
	-								Average =	Sum(39) ₁	12 /12=	54.05	(3
9)m= 55.5	arameter (I	-II P) \\\/	/m²K										(
	arameter (I	HLP), W	/m²K 1.01	1.01	0.99	0.99	0.99		1.01		1.02]	(

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. Wa	iter heat	ing ener	gy requi	rement:								kWh/ye	ear:	
if TF			N + 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9))2)] + 0.0	0013 x (T	ΓFA -13.		.8		(42)
Reduce	the annua	l average	ater usag hot water person per	usage by	5% if the a	welling is	designed t			se target o		.83		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
İ		n litres per	day for ea										Ī	
(44)m=	84.52	81.44	78.37	75.3	72.22	69.15	69.15	72.22	75.3	78.37	81.44	84.52	221.22	7,440
Energy o	content of	hot water	used - cal	culated mo	onthly = 4 .	190 x Vd,r	n x nm x D	OTm / 3600			m(44) ₁₁₂ = ables 1b, 1		921.99	(44)
(45)m=	125.33	109.62	113.12	98.62	94.63	81.66	75.67	86.83	87.86	102.4	111.77	121.38		
If instant	taneous w	ater heatir	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		Γotal = Su	m(45) ₁₁₂ =	=	1208.88	(45)
(46)m=	0	0	0	0	0	0	0	0	0	0	0	0		(46)
	storage													
•		, ,	includin				_		ame ves	sel		150		(47)
Otherw	•	stored	nd no ta hot wate		•			' '	ers) ente	er '0' in (47)			
	•		eclared l	oss facto	or is kno	wn (kWh	n/day):					0		(48)
Tempe	rature fa	actor fro	m Table	2b								0		(49)
• • • • • • • • • • • • • • • • • • • •			storage	-				(48) x (49)) =			0		(50)
			eclared of factor fr	-								0		(51)
		-	ee secti		- (,,					0		(= :)
		from Tal		0.1								0		(52)
•			m Table									0		(53)
• • • • • • • • • • • • • • • • • • • •		m water 54) in (5	storage	, KVVh/ye	ear			(47) x (51)	x (52) x (53) =	-	0		(54) (55)
	` ' '	, ,	culated f	or each	month			((56)m = (55) × (41)r	m		U		(55)
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
If cylinde	er contains	dedicated	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
Primar	y circuit	loss (an	nual) fro	m Table	3							0		(58)
	•		culated from Tab		•		. ,	, ,		r thermo	etat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss cal	culated	for each	month ((61)m =	(60) ÷ 36	65 × (41))m			-		•	
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat re	quired for	water he	eating ca	alculated	l for	each	month	(62)	m =	0.85 × (45)m	+ (46)m +	(57)m +	(59)m + (61)m	
(62)m= 106.53	93.18	96.15	83.82	80.43	69	.41	64.32	73.	.8	74.68	87.04	95.01	103.17		(62)
Solar DHW inpu	t calculated	using App	endix G oı	Appendix	H (n	egativ	e quantity	v) (ent	er '0'	if no solar	contrib	ution to wate	er heating)	_	
(add addition	al lines if	FGHRS	and/or \	WWHRS	app	olies,	see Ap	pend	lix C	3)				-	
(63)m= 0	0	0	0	0		0	0	0)	0	0	0	0		(63)
Output from	water hea	iter												_	
(64)m= 106.53	93.18	96.15	83.82	80.43	69	.41	64.32	73.	.8	74.68	87.04	95.01	103.17		_
									Outp	out from wa	ater hea	ter (annual) ₁	l12	1027.54	(64)
Heat gains fr	om water	heating,	kWh/m	onth 0.2	5 ′ [0.85	× (45)m	+ (6	1)m] + 0.8 x	[(46)r	n + (57)m	+ (59)m]	
(65)m= 26.63	23.29	24.04	20.96	20.11	17	.35	16.08	18.	45	18.67	21.76	23.75	25.79		(65)
include (57)m in cal	culation o	of (65)m	only if c	ylino	der is	in the o	dwell	ing	or hot wa	ater is	from com	munity h	neating	
5. Internal	gains (see	e Table 5	and 5a):											
Metabolic ga	ins (Table	e 5), Wat	ts											_	
Jan	Feb	Mar	Apr	May	J	un	Jul	Αı	ug	Sep	Oct	Nov	Dec		
(66)m= 89.75	89.75	89.75	89.75	89.75	89	.75	89.75	89.	75	89.75	89.75	89.75	89.75		(66)
Lighting gain	s (calcula	ited in Ap	pendix	L, equat	ion l	L9 or	L9a), a	lso s	ee ¯	Table 5				_	
(67)m= 14.43	12.82	10.42	7.89	5.9	4.	98	5.38	7	,	9.39	11.92	13.91	14.83		(67)
Appliances g	ains (calc	culated in	Append	dix L, eq	uatio	on L1	3 or L1	3a), a	also	see Tal	ole 5			_	
(68)m= 156.47	7 158.09	154	145.29	134.29	123	3.96	117.06	115	.43	119.52	128.2	3 139.23	149.56]	(68)
Cooking gain	s (calcula	ated in A	ppendix	L, equa	tion	L15 c	or L15a)	, als	o se	ee Table	5				
(69)m= 31.98	31.98	31.98	31.98	31.98	31	.98	31.98	31.	98	31.98	31.98	31.98	31.98		(69)
Pumps and f	ans gains	(Table 5	āa)												
(70)m= 0	0	0	0	0		0	0	0)	0	0	0	0		(70)
Losses e.g. e	evaporatio	on (negat	tive valu	es) (Tab	le 5)								_	
(71)m= -71.8	-71.8	-71.8	-71.8	-71.8	-7	1.8	-71.8	-71	.8	-71.8	-71.8	-71.8	-71.8		(71)
Water heatin	g gains (٦	Table 5)												_	
(72)m= 35.8	34.66	32.31	29.11	27.03	24	4.1	21.61	24.	.8	25.93	29.25	32.99	34.67		(72)
Total interna	al gains =	=				(66)n	n + (67)m	+ (68	3)m +	- (69)m + (70)m +	(71)m + (72))m	_	
(73)m= 256.62		246.66	232.21	217.15	202	2.97	193.97	197	.15	204.77	219.3	3 236.06	248.99		(73)
6. Solar gai															
Solar gains are		ŭ			and a			tions	to co	nvert to the	e applic		tion.		
Orientation:	Access F Table 6d		Area m²			Flux Tab	le 6a		Т	g_ able 6b		FF Table 6c		Gains (W)	
West 0.9x	0.77	X	8.9	95	х	19	9.64	x		0.63	x	0.7		53.72	(80)
West 0.9x	0.77	X	8.9	95	x [38	3.42	x		0.63	×	0.7		105.09	(80)
West 0.9x	0.77	X	8.9	95	x [63	3.27	x		0.63	×	0.7		173.07	(80)
West 0.9x	0.77	x	8.9	95	x	92	2.28	x		0.63	x	0.7		252.41	(80)
West 0.9x	0.77	x	8.9	95	х	11:	3.09	x		0.63	×	0.7	=	309.34	(80)
West 0.9x	0.77	x	8.9	95	x	11:	5.77	x		0.63	x	0.7		316.66	(80)
West 0.9x	0.77	X	8.9	95	х	11	0.22	x		0.63	x	0.7	=	301.47	(80)
West 0.9x	0.77	x	8.9	95	х	94	1.68	x		0.63	x	0.7	=	258.96	(80)
					_			'			_				_

	_					_										_
West	0.9x	0.77	x	8.9	95	x	73	3.59	x		0.63	x	0.7	=	201.28	(80)
West	0.9x	0.77	x	8.9	95	x	45	5.59	x		0.63	x	0.7	=	124.7	(80)
West	0.9x	0.77	x	8.9	95	x	24	4.49	x		0.63	x [0.7	=	66.98	(80)
West	0.9x	0.77	X	8.9	95	x	16	6.15	x		0.63	x	0.7	=	44.18	(80)
Solar	gains in	watts, ca	alculated	for eac	h month				(83)m :	= Su	ım(74)m .	(82)m			_	
(83)m=	53.72	105.09	173.07	252.41	309.34	316	6.66	301.47	258.9	96	201.28	124.7	66.98	44.18		(83)
Total g	jains – i	nternal a	nd solar	(84)m =	= (73)m ·	+ (8:	3)m ,	watts					•	•	-	
(84)m=	310.34	360.59	419.72	484.62	526.48	519	9.63	495.45	456.1	11	406.05	344.03	303.04	293.17		(84)
7. Me	an inter	nal temp	erature	(heating	season)										
Temp	erature	during h	eating p	eriods ir	n the livii	ng a	rea fr	rom Tab	ole 9,	Th1	1 (°C)				21	(85)
Utilisa	ation fac	tor for g	ains for l	iving are	ea, h1,m	(se	e Tab	ole 9a)								
	Jan	Feb	Mar	Apr	May	È	Jun		Au	g T	Sep	Oct	Nov	Dec]	
(86)m=	1	1	0.99	0.94	0.83	0.	.63	0.47	0.53	- 	0.8	0.97	1	1	1	(86)
Moon	intorno	l tompor	oturo in	livina or	00 T1 /f/	المال	v eten	2 to 7	l In To	ماط	. 00)		·		J	
(87)m=	19.89	l temper	20.31	20.65	20.88).98	21	20.9	$\overline{}$	20.93	20.59	20.19	19.88	1	(87)
										_		20.00	20.13	15.00]	(0.)
		during h				_					<u> </u>			1	7	4
(88)m=	20.05	20.06	20.06	20.08	20.08	20	0.09	20.09	20.1		20.09	20.08	20.07	20.07]	(88)
Utilisa	ation fac	tor for g	ains for	rest of d	welling,	h2,n	n (se	e Table	9a)						_	
(89)m=	1	0.99	0.98	0.92	0.78	0.	.55	0.37	0.43	3	0.73	0.96	0.99	1		(89)
Mean	interna	l temper	ature in	the rest	of dwelli	na T	T2 (fo	ollow ste	eps 3 t	to 7	' in Tabl	e 9c)		-	_	
(90)m=	19.04	19.2	19.46	19.79	20	Ť	0.08	20.09	20.0	-	20.05	19.75	19.35	19.03]	(90)
									<u>!</u>		f	LA = Livi	ng area ÷ (4	4) =	0.46	(91)
Maan	intorno	l tompor	oturo (fo	r tha wh	ماد طیرہ	م دانا	.\ £1	ΛΤ1	. (1	£1	Λ) Το					
(92)m=	19.44	19.59	19.85	20.19	20.41	Ť	0.5	20.51	20.5		20.46	20.14	19.74	19.42	1	(92)
		nent to the	<u> </u>										13.74	13.42]	(02)
(93)m=	19.44	19.59	19.85	20.19	20.41		0.5	20.51	20.5	-	20.46	20.14	19.74	19.42	1	(93)
		ting requ			20.11	`	0.0	20.01		<u>. 1</u>	20.10	20.11	10.71	10.12		(==)
		·			re obtair	ed a	at ste	n 11 of	Table	9h	so tha	t Ti m=	(76)m an	d re-cal	culate	
		factor fo					at oto	,p 11 01	rabio	, 00	, 00 1110		7 0)111 411	a ro can	Salato	
	Jan	Feb	Mar	Apr	May	J	Jun	Jul	Au	g	Sep	Oct	Nov	Dec]	
Utilisa	ation fac	tor for g	ains, hm	:										•	_	
(94)m=	1	0.99	0.98	0.93	0.8	0.	.59	0.42	0.47	7	0.76	0.96	0.99	1		(94)
Usefu	ıl gains,	hmGm	W = (94)	1)m x (8	4)m								_		_	
(95)m=	309.5	358.25	411.28	449.38	418.9	30	5.25	206.29	215.3	36	309.96	331.13	301.24	292.58		(95)
Month	hly aver	age exte	rnal tem	perature	from Ta	able	8								_	
(96)m=	4.3	4.9	6.5	8.9	11.7	14	4.6	16.6	16.4	1	14.1	10.6	7.1	4.2		(96)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm .	, W =	[(39)m	x [(93)m-	- (96)m]	_		-	
(97)m=	840.74	812.69	735.71	610.26	469.13	312	2.41	207.14	217.0)2	338.74	514.07	685.64	832.29		(97)
Space		g require	ement fo	r each n	nonth, k	/Vh/ı	month	h = 0.02	24 x [(97)	m – (95)m] x (4	1)m	1	1	
(98)m=	395.24	305.39	241.38	115.84	37.37		0	0	0		0	136.1	276.77	401.55		_
									Т	otal	per year	(kWh/yea	r) = Sum(9	8)15,912 =	1909.63	(98)
Space	e heatin	g require	ement in	kWh/m²	² /year										35.65	(99)
																_

8c. Sp	pace co	oling req	uiremer	nt										
Calcu	lated fo	r June, J	luly and	August.	See Tal	ole 10b							•	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat I	oss rate	Lm (ca	lculated	using 25	5°C inter	nal temp	erature	and exte	ernal ten	nperatur	e from T	able 10)		
(100)m=	0	0	0	0	0	497.77	391.86	401.17	0	0	0	0		(100)
Utilisa	ition fac	tor for lo	ss hm									_		
(101)m=	0	0	0	0	0	0.95	0.98	0.96	0	0	0	0		(101)
Usefu	l loss, h	mLm (V	/atts) = ((100)m x	(101)m									
(102)m=	0	0	0	0	0	471.16	382.5	386.86	0	0	0	0		(102)
Gains	(solar (gains cal	lculated	for appli	cable we	eather re	gion, se	e Table	10)					
(103)m=	0	0	0	0	0	675.15	645.61	600.72	0	0	0	0		(103)
•	•					lwelling,	continuo	ous (kW	h') = 0.02	24 x [(10	03)m – (102)m]:	x (41)m	
` 1		ì	104)m <	<u> </u>		4.40.00	105.75	450.44	0	0	0			
(104)m=	0	0	0	0	0	146.88	195.75	159.11	0 T 1 - 1	0	0	0		٦,,,,,
Coolod	fraction	,								= Sum(cooled a	,	=	501.74	(104) (105)
		-	able 10b)					10=	coolea	aiea - (²	+) =	1	(103)
(106)m=		0	0	0	0	0.25	0.25	0.25	0	0	0	0		
` ′									Total	l = Sum((104)	=	0	(106)
Space	cooling	requirer	ment for	month =	(104)m	× (105)	× (106)r	n		(-00 - /			┛`′
(107)m=	0	0	0	0	0	36.72	48.94	39.78	0	0	0	0		
•									Total	= Sum(107)	=	125.44	(107)
Space	cooling	requirer	nent in k	:Wh/m²/y	/ear				(107)	÷ (4) =			2.34	(108)
8f. Fab	ric Ener	gy Effici	ency (ca	alculated	only un	der spec	cial cond	litions, se	ee sectio	on 11)				
Fabrio	Energy	/ Efficier	псу						(99) -	+ (108) =	=		38	(109)
Targe	t Fabri	c Energ	y Efficie	ency (TF	EE)								43.7	(109)

			llser F	Details:						
Accessor Name	John Acho		O S C I L		a Nium	hori		STDO	0021269	
Software Name:		2012								
			roperty				PETTS V			
Address :										
1. Overall dwelling dime	ensions:									
One of the co				` ′	L			٦,_ ,		_
Ground floor				53.56	(1a) x	2	.66	(2a) =	142.47	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)+(1r	ገ) [53.56	(4)					
Dwelling volume					(3a)+(3b)+(3c)+(3d	l)+(3e)+	.(3n) =	142.47	(5)
2. Ventilation rate:										
			У	other		total			m³ per hou	r
Number of chimneys	0	+ 0	+	0] = [0	X 4	40 =	0	(6a)
Number of open flues	Property Address: Unit 39 - COPPETTS WOOD, London									
Number of intermittent fa	ans					2	x .	10 =	20	(7a)
Number of passive vents	3				F	0	x -	10 =	0	 (7b)
Number of flueless gas f	ires				F	0	X	40 =	0	☐(7c)
g					L					
								Air ch	nanges per ho	ur
Infiltration due to chimne	ys, flues and fans	s = (6a) + (6b) + (7a)	7a)+(7b)+((7c) =	Γ	20		÷ (5) =	0.14	(8)
		intended, procee	d to (17),	otherwise o	continue fr	om (9) to ((16)			<u>-</u>
•	he dwelling (ns)									
	OF for atool or tim	ahar frama ar	. 0 25 fo	r maaan	m. conotr	ustion	[(9)	-1]x0.1 =		= '
					•	uction			0	(11)
deducting areas of openi	ngs); if equal user 0.3	5	J		,					
·	•	,	.1 (seale	ed), else	enter 0				0	=
•	·								0	╡
<u>-</u>	s and doors drau	ght stripped		0.25 [0.2) v (1.4\ · 1	1001 -				╡゛゛
				•	. ,	-	+ (15) =			╡` ′
	a50 expressed i	n cubic metre	s ner ho					area		╡
•			•	•	•	0110 01 0	птоюро	aroa		╡
•	-					is being u	sed		0.00	
Number of sides sheltered	ed								0	(19)
Shelter factor						19)] =			1	╡
•	_			(21) = (18) x (20) =				0.39	(21)
	 	.	1	Δ	0	0-4	l Na		1	
L			Jul	Aug	Sep	l Oct	I NOV	Dec	I	
	1	1	2.0	0.7		1 4 2	A F	4.7	1	
(22)m= 5.1 5	4.9 4.4	4.3 3.8	3.8	3./	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2	2)m ÷ 4									
(22a)m= 1.27 1.25	1.23 1.1 1	.08 0.95	0.95	0.92	1	1.08	1.12	1.18		

0.5	0.49	0.48	0.43	0.42	0.37	0.37	0.36	0.39	0.42	0.44	0.46		
		•	rate for t	he appli	cable ca	se	!		<u>!</u>		ļ	1	
			anadin NL (O	ah) (aa-	· \		\ 	: (00h	\ (00-\			0	
) = (23a)			0	===
		•	•	ŭ		,			Ola)	201.) [4 (00)		(2:
	0.5												
											0	İ	(-
· —	1				1		- ^ ` ` 	<u> </u>	r Ó		0	1	(2
·												l	•
,				•	•				.5 × (23b)			
<u>``</u>	1	<u> </u>	<u> </u>	<u> </u>	ŕ –	· ` `	É `	<u> </u>	· ` ·		0		(2
d) If natural	ventilati	on or wh	ole hous	e positiv	ve input	ventilatio	on from I	oft				I	
if (22b)r	n = 1, th	en (24d)	m = (22l	o)m othe	rwise (2	4d)m =	0.5 + [(2	2b)m² x	0.5]				
24d)m= 0.62	0.62	0.61	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.6	0.61	j	(2
Effective air	change	rate - er	nter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)				,	
25)m= 0.62	0.62	0.61	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.6	0.61		(2
3. Heat losse	s and he	eat loss	paramete	er:									
LEMENT					Net Ar	ea							
	area	(m²)	m	²	A ,r				(W/ł	<)	kJ/m²-l	<	kJ/K
Vindows					8.95	x1	/[1/(0.9)+	0.04] =	7.78	╛.			(2
Valls	27.4	13	8.95		18.48	X	0.15	=	2.77				(2
loof	53.6	31	0		53.61	X	0.13	=	6.97				(3
otal area of	elements	, m²			81.04	ļ							(3
						ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	s given in	paragraph	1 3.2	
	1.5												
	Column C												
	1.5												
	•	•		,			ecisely the				able 1f	100	(
· ·						,	Í						
hermal bridg	es : S (L	x Y) cal	culated (using Ap	pendix l	<						12.16	(3
		are not kn	own (36) =	= 0.05 x (3	1)			(0.0)	(0.0)				
										>		29.67	(3
	1											1	
	+				-		-				+	ļ	(3
	∠9.11		27.84	27.65	∠b./4	26.74	∠6.5/		<u> </u>		∠8.45	i	(3
88)m= 29.33	0.43												
38)m= 29.33 leat transfer		· ·			I 56 /1	56.41	56.25	56.76	57.32	57.71	58.13	1	
38)m= 29.33 leat transfer		· ·	57.51	57.32	30.41						1		
29.33 leat transfer 39)m= 59	58.78	58.56		57.32	30.41		Į				12 /12=	57.51	(3
29.33 Heat transfer 39)m= 59 Heat loss para	Case												

Number of days in month (Table 1a)

Numbe	er or day	's in mor	าเก (тар	ie Ta)									•	
	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 Wa	ater heat	ing ener	av regui	rement								kWh/ye	ear.	
1. ***	ator riout	ing ono.	gy roqui	TOTTIOTIC.								icovii, y c	Jui.	
	ned occu											.8		(42)
	A > 13.9 A £ 13.9		+ 1.76 x	[1 - exp	(-0.0003	349 x (TI	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.	9)			
		-	ater usad	ne in litre	es ner da	av Vd av	erane –	(25 x N)	+ 36		76	.83		(43)
									a water us	se target o		.03		(43)
not more	e that 125	litres per p	person per	day (all w	ater use, l	hot and co	ld)							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate	er usage ir	n litres per	day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)		•				
(44)m=	84.52	81.44	78.37	75.3	72.22	69.15	69.15	72.22	75.3	78.37	81.44	84.52		
										Total = Su	m(44) ₁₁₂ =	=	921.99	(44)
Energy (content of	hot water	used - cal	culated m	onthly $= 4$.	190 x Vd,ı	n x nm x E	OTm / 3600) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		_
(45)m=	125.33	109.62	113.12	98.62	94.63	81.66	75.67	86.83	87.86	102.4	111.77	121.38		
								•		Total = Su	m(45) ₁₁₂ =	=	1208.88	(45)
If instan	taneous w	ater heatir	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46) to (61)					
(46)m=	0	0	0	0	0	0	0	0	0	0	0	0		(46)
	storage					0.4/LIDO							ı	
_		,					_		ame ves	sel		0		(47)
	•	-			-		litres in	` '	` .	(0): (4-7\			
			not wate	er (tnis ir	iciuaes i	nstantar	neous co	mbi boli	ers) ente	er o in (47)			
	storage		eclared l	oss facto	or is kno	wn (kWł	n/day).					0		(48)
	erature fa				51 10 KHO		naay).							` '
•					oor			(49) v (40)	\ _			0		(49)
•	y lost fro nanufact		_		ear loss fact	or is not	known:	(48) x (49)) =			0		(50)
					le 2 (kW							0		(51)
	munity h													
Volum	e factor	from Tal	ble 2a									0		(52)
Tempe	erature fa	actor fro	m Table	2b								0		(53)
Energy	lost fro	m water	storage	, kWh/y	ear			(47) x (51)) x (52) x (53) =		0		(54)
Enter	(50) or (54) in (5	55)									0		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)	m				
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
If cylinde	er contains	dedicated	d solar sto	rage, (57)	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	i lix H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
		1 /	1\ (T. I. I.		<u> </u>	<u> </u>	<u> </u>	l			<u> </u>		(58)
	y circuit	,	•			E0\m	(EQ) + 26	SE (41)				0		(38)
	-					•	. ,	$65 \times (41)$	ı cylinde	r thermo	etat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
					<u> </u>	<u> </u>	<u> </u>	<u> </u>						(/
					ì	ì ´	65 × (41)	<u></u>					1	(5.1)
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat required for water he	eating calculate	d for each montl	$n (62)m = 0.85 \times (4)$	45)m + (46)m +	(57)m +	(59)m + (61)m	
(62)m= 106.53 93.18 96.15	83.82 80.43	69.41 64.32	73.8 74.68	87.04 95.01	103.17		(62)
Solar DHW input calculated using App	endix G or Appendi	x H (negative quanti	ty) (enter '0' if no solar o	contribution to wate	er heating)		
(add additional lines if FGHRS	and/or WWHRS	S applies, see A	ppendix G)				
(63)m= 0 0 0	0 0	0 0	0 0	0 0	0		(63)
Output from water heater							
(64)m= 106.53 93.18 96.15	83.82 80.43	69.41 64.32	73.8 74.68	87.04 95.01	103.17		_
			Output from water	er heater (annual) _{1.}	12	1027.54	(64)
Heat gains from water heating,	kWh/month 0.2	25 ´ [0.85 × (45)r	n + (61)m] + 0.8 x [[(46)m + (57)m	+ (59)m]	
(65)m= 26.63 23.29 24.04	20.96 20.11	17.35 16.08	18.45 18.67	21.76 23.75	25.79		(65)
include (57)m in calculation of	of (65)m only if	cylinder is in the	dwelling or hot war	ter is from com	munity h	eating	
5. Internal gains (see Table 5	5 and 5a):						
Metabolic gains (Table 5), Wat	ts						
Jan Feb Mar	Apr May	Jun Jul	Aug Sep	Oct Nov	Dec		
(66)m= 89.75 89.75 89.75	89.75 89.75	89.75 89.75	89.75 89.75	89.75 89.75	89.75		(66)
Lighting gains (calculated in Ap	opendix L, equa	tion L9 or L9a),	also see Table 5				
(67)m= 14.43 12.82 10.42	7.89 5.9	4.98 5.38	7 9.39	11.92 13.91	14.83		(67)
Appliances gains (calculated in	Appendix L, ed	quation L13 or L	13a), also see Tabl	le 5			
(68)m= 156.47 158.09 154	145.29 134.29	123.96 117.06	115.43 119.52	128.23 139.23	149.56		(68)
Cooking gains (calculated in Ap	ppendix L, equa	tion L15 or L15a	a), also see Table 5	5			
(69)m= 31.98 31.98 31.98	31.98 31.98	31.98 31.98	31.98 31.98	31.98 31.98	31.98		(69)
Pumps and fans gains (Table 5	5a)						
(70)m= 0 0 0	0 0	0 0	0 0	0 0	0		(70)
Losses e.g. evaporation (negat	tive values) (Tal	ble 5)					
(71)m= -71.8 -71.8 -71.8	-71.8 -71.8	-71.8 -71.8	-71.8 -71.8	-71.8 -71.8	-71.8		(71)
Water heating gains (Table 5)	•		•				
(72)m= 35.8 34.66 32.31	29.11 27.03	24.1 21.61	24.8 25.93	29.25 32.99	34.67		(72)
Total internal gains =		(66)m + (67)	m + (68)m + (69)m + (70	0)m + (71)m + (72)	m		
(73)m= 256.62 255.5 246.66	232.21 217.15	202.97 193.97	197.15 204.77	219.33 236.06	248.99		(73)
6. Solar gains:							
Solar gains are calculated using solar	r flux from Table 6a	and associated equ	ations to convert to the	applicable orientati	ion.		
Orientation: Access Factor	Area	Flux	g_ Table 01	FF		Gains	
Table 6d	m²	Table 6a	Table 6b	Table 6c		(W)	_
West 0.9x 0.77 x	8.95	x 19.64	x 0.63	× 0.7	=	53.72	(80)
West 0.9x 0.77 x	8.95	X 38.42	x 0.63	× 0.7	=	105.09	(80)
West 0.9x 0.77 x	8.95	x 63.27	x 0.63	× 0.7	=	173.07	(80)
West 0.9x 0.77 x	8.95	x 92.28	x 0.63	x 0.7	=	252.41	(80)
West 0.9x 0.77 x	8.95	x 113.09	x 0.63	x 0.7	=	309.34	(80)
West 0.9x 0.77 x	8.95	x 115.77	x 0.63	x 0.7	=	316.66	(80)
West 0.9x 0.77 x	8.95	x 110.22	x 0.63	x 0.7	=	301.47	(80)
West 0.9x 0.77 x	8.95	x 94.68	× 0.63	x 0.7	=	258.96	(80)

	_					_										
West	0.9x	0.77	x	8.9	95	x	73	3.59	x		0.63	X	0.7	=	201.28	(80)
West	0.9x	0.77	X	8.9	95	x	45	5.59	x		0.63	X	0.7	=	124.7	(80)
West	0.9x	0.77	x	8.9	95	x	24	4.49	x		0.63	x	0.7	=	66.98	(80)
West	0.9x	0.77	Х	8.9	95	x	16	6.15	x		0.63	x	0.7	=	44.18	(80)
Solar	gains in	watts, ca	alculated	for eac	h month				(83)m	= St	um(74)m .	(82)m			_	
(83)m=	53.72	105.09	173.07	252.41	309.34	316	6.66	301.47	258.	96	201.28	124.7	66.98	44.18		(83)
Total g	jains – i	nternal a	nd solar	(84)m =	= (73)m ·	+ (8	3)m ,	watts					•		_	
(84)m=	310.34	360.59	419.72	484.62	526.48	519	9.63	495.45	456.	11	406.05	344.03	303.04	293.17]	(84)
7. Me	an inter	nal temp	erature	(heating	season)										
Temp	erature	during h	eating p	eriods ir	n the livii	ng a	ırea fı	rom Tab	ole 9,	Th	1 (°C)				21	(85)
Utilisa	ation fac	tor for g	ains for I	iving are	ea, h1,m	(se	e Tal	ble 9a)			, ,					_
	Jan	Feb	Mar	Apr	May	È	Jun	Jul	Αι	ıa T	Sep	Oct	Nov	Dec	7	
(86)m=	0.97	0.95	0.92	0.85	0.74		.59	0.46	0.5	- 	0.72	0.89	0.95	0.97	-	(86)
) / Malain				l: ::				0 4			. 0-1		_		_	
		18.95	ature in				v step).81	20.93				20.01	19.25	18.64	7	(87)
(87)m=	18.68	18.95	19.42	20.02	20.5		0.81	20.93	20.9	71	20.66	20.01	19.25	18.64	_	(07)
Temp	erature	during h	eating p		rest of	_	Ť	from Ta	ble 9	, Th	n2 (°C)		_		7	
(88)m=	20	20	20.01	20.02	20.03	20).04	20.04	20.0)4	20.03	20.03	20.02	20.01		(88)
Utilisa	ation fac	tor for g	ains for ı	rest of d	welling,	h2,n	n (se	e Table	9a)							
(89)m=	0.96	0.95	0.91	0.82	0.7	0.	.52	0.37	0.42	2	0.66	0.87	0.95	0.97		(89)
Mean	interna	l temper	ature in	the rest	of dwelli	na T	T2 (fo	ollow ste	ens 3	to 7	' in Tahl	e 9c)	•	•	_	
(90)m=	17.87	18.14	18.61	19.2	19.64	Ť	9.92	20.01	20	Т	19.8	19.2	18.45	17.85	7	(90)
, ,									<u>!</u>		f	LA = Liv	ng area ÷ (4) =	0.46	(91)
							`				A) TO					``
			ature (fo			Ť						40.57	10.00	1004	7	(92)
(92)m=	18.25	18.52	18.99	19.58	20.04).34	20.44	20.4		20.2	19.57	18.82	18.21	_	(92)
(93)m=	18.25	18.52	ne mean 18.99	19.58	20.04	ī	e fror	m rabie 20.44	20.4		20.2	19.57	18.82	18.21	7	(93)
					20.04	20).34	20.44	20.4	12	20.2	19.57	10.02	10.21		(90)
•			uirement		ro obtoir	od (at eta	n 11 of	Table	n Oh	oo tha	t Ti m-	(76)m an	d ro cal	culato	
			ernar ter or gains t			ieu a	ai Sie	p ii oi	Table	e en), 50 ilia	ι 11,111=	(76)III ali	u re-car	culate	
	Jan	Feb	Mar	Apr	May	J	Jun	Jul	Αι	ıa	Sep	Oct	Nov	Dec	7	
Utilisa	ation fac	tor for g	ains, hm	•						<u> </u>	•				_	
(94)m=	0.95	0.93	0.89	0.81	0.7	0.	.55	0.41	0.46	6	0.67	0.86	0.93	0.96		(94)
Usefu	ıl gains,	hmGm .	W = (94	1)m x (8	4)m		'						_!		_	
(95)m=	295.79	336.05	373.72	393.19	366.31	283	3.79	203.41	208.	43	272.96	295.13	283.18	281.09		(95)
Month	hly aver	age exte	rnal tem	perature	from Ta	able	8		•					<u> </u>	_	
(96)m=	4.3	4.9	6.5	8.9	11.7	14	4.6	16.6	16.4	4	14.1	10.6	7.1	4.2		(96)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm	, W =	=[(39)m :	x [(93	3)m-	- (96)m]	•	•	_	
(97)m=	822.82	800.49	731.14	614.26	478.13	323	3.53	216.4	226.	08	346.09	514.37	676.33	814.6		(97)
Space	e heatin	g require	ement fo	r each n	nonth, k	/Vh/ı	montl	h = 0.02	24 x [((97)	m – (95)m] x (11)m		_	
(98)m=	392.11	312.1	265.92	159.17	83.19		0	0	0		0	163.12	283.07	396.94		
									1	Fotal	per year	(kWh/ye	ar) = Sum(9	18)15,912 =	2055.62	(98)
Space	e heatin	g require	ement in	kWh/m²	² /year										38.38	(99)
•		- '			•											

8c. Sp	pace co	oling rec	quiremen	t										
Calcu	lated fo	r June, c	July and	August.	See Tal	ole 10b							i	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat I	loss rate	ELm (ca	lculated	using 2	5°C inter	nal temp	oerature	and exte	ernal ten	nperatur	e from T	able 10)		
(100)m=	0	0	0	0	0	530.28	417.46	427.46	0	0	0	0		(100)
Utilisa	ation fac	tor for lo	ss hm										•	
(101)m=	0	0	0	0	0	0.82	0.87	0.84	0	0	0	0		(101)
Usefu	l loss, h	mLm (V	/atts) = (100)m x	(101)m								i	
(102)m=	0	0	0	0	0	432.31	362.46	360.79	0	0	0	0		(102)
Gains	(solar	gains ca	lculated	for appli	cable we	eather re	egion, se	e Table	10)				•	
(103)m=	0	0	0	0	0	675.15	645.61	600.72	0	0	0	0		(103)
•			ement fo 104)m <			lwelling,	continuo	ous (kW	h' = 0.0	24 x [(10	03)m – (102)m];	x (41)m	
(104)m=	0	0	0	0	0	174.85	210.67	178.51	0	0	0	0		
•									Total	= Sum(104)	=	564.03	(104)
	I fraction	-							f C =	cooled	area ÷ (4	4) =	1	(105)
		actor (Ta	able 10b)			1						1	_
(106)m=	0	0	0	0	0	0.25	0.25	0.25	0	0	0	0		_
_									Total	I = Sum(104)	=	0	(106)
			ment for										Ī	
(107)m=	0	0	0	0	0	43.71	52.67	44.63	0	0	0	0		_
									Total	= Sum(107)	=	141.01	(107)
Space	cooling	requirer	ment in k	:Wh/m²/y	/ear				(107)	\div (4) =			2.63	(108)
8f. Fab	ric Ene	rgy Effici	iency (ca	lculated	only un	der spec	cial cond	litions, se	ee sectio	on 11)				
Fabrio	Energy	y Efficier	псу						(99)	+ (108) =	=		41.01	(109)

User Details: **Assessor Name:** John Ashe Stroma Number: STRO031268 Stroma FSAP 2012 **Software Version: Software Name:** Version: 1.0.5.8 Property Address: Unit 39 - COPPETTS WOOD, London Address: 1. Overall dwelling dimensions Area(m²) Av. Height(m) Volume(m³) Ground floor (1a) x (2a) = 142.47 (3a) 53.56 2.66 Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+....(1n)(4)53.56 Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+....(3n) =142.47 (5) total main secondary other m³ per hour heating heating x 40 =Number of chimneys (6a) 0 0 x 20 =Number of open flues 0 O O 0 0 (6b) Number of intermittent fans x 10 =(7a) 0 0 x 10 =Number of passive vents (7b) 0 0 x 40 =Number of flueless gas fires (7c)Air changes per hour Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = \div (5) = (8) If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) (9) O Additional infiltration (10)[(9)-1]x0.1 =0 Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction (11)0 if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0 0 (12) If no draught lobby, enter 0.05, else enter 0 (13)0 Percentage of windows and doors draught stripped (14)0 Window infiltration $0.25 - [0.2 \times (14) \div 100] =$ 0 (15)Infiltration rate (8) + (10) + (11) + (12) + (13) + (15) =O (16)Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area (17)5 If based on air permeability value, then $(18) = [(17) \div 20] + (8)$, otherwise (18) = (16)0.25 (18)Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered (19)0 $(20) = 1 - [0.075 \times (19)] =$ Shelter factor (20)1 $(21) = (18) \times (20) =$ Infiltration rate incorporating shelter factor 0.25 (21)Infiltration rate modified for monthly wind speed Jan Feb Jul Sep Mar Apr Mav Jun Aug Oct Nov Dec Monthly average wind speed from Table 7 (22)m =5.1 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7 Wind Factor $(22a)m = (22)m \div 4$ (22a)m 1.27 1.25 1.23 1.08 0.95 0.95 0.92 1 1.08 1.12 1.1 1.18

Adjusted infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m				_	
0.32	0.31	0.31	0.28	0.27	0.24	0.24	0.23	0.25	0.27	0.28	0.29		
		•	rate for t	he appli	cable ca	se							
			endix N (2	3h) = (23a	a) × Fmv (4	equation (NS)) othe	rwise (23h	n) = (23a)				=
		0		, ,	,	. `	,, .	,) = (20a)				= `
		-	•	_					Ob\ (00h) [/	1 (00.0)		(230
· -	0.31												
′	1.0 1.0		(24										
		i	i		1	· · · ·	- 	i i	1	 	Ι ,	1	(24
.,			<u> </u>				<u> </u>		0	U	0]	(24
•				•	•				5 v (23h	,)			
<u>``</u>		<u> </u>	<u> </u>		ŕ	<u> </u>	ŕ	ŕ	· `	í –	<u> </u>	1	(24
							<u> </u>					J	(
,				•	•				0.5]				
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change	rate - er	nter (24a) or (24k	o) or (24	c) or (24	d) in bo	x (25)	•		•	•	
(25)m= 0.43	0.43	0.42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41]	(25)
2 Heatleses	مط ام مرم	at loss :	2 0 4 0 122 0 4	.								1	
					Not An		l l vol		A V I I		le volue	Δ Δ	V Iz
ELEMENT		_											
Vindows					8.95	x1	/[1/(0.9)+	0.04] =	7.78	Ì			(27)
Nalls	27.4	13	8.95		18.48	3 x	0.15		2.77	=		$\neg \Box$	(29)
Roof	53.6	61	0	=	53.61	x	0.13			≓ i		7 =	(30
						_	00						
			effective wi	ndow U-va			n formula 1	/[(1/U-val	ue)+0.041 a	ns aiven in	paragrapi	n 3.2	(01)
							,		,	J	, , ,		
abric heat los	s, W/K	= S (A x	U)				(26)(30)) + (32) =				17.52	(33
Heat capacity	Cm = S((Axk)						((28).	(30) + (32	2) + (32a).	(32e) =	1108.8	(34
Thermal mass	parame	ter (TMF	P = Cm -	- TFA) ir	n kJ/m²K			Indica	ative Value:	: Low		100	(35
•				construct	ion are no	t known pi	recisely the	e indicative	e values of	TMP in Ta	able 1f		
				using Ap	pendix I	K						12.16	(36
_	,	,		• .	•								`
Total fabric he	at loss							(33) +	+ (36) =			29.67	(37
entilation hea	at loss ca	alculated	monthly	y				(38)m	$n = 0.33 \times ($	25)m x (5))		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
38)m= 20.31	20.02	19.72	18.25	17.96	16.49	16.49	16.2	17.08	17.96	18.55	19.14		(38
Heat transfer of	oefficie	nt, W/K						(39)m	n = (37) + (37)	38)m		_	
		·	47.93	47.63	46.16	46.16	45.87	46.75	47.63	48.22	48.81]	
	<u> </u>	!	!						Average =	Sum(39) ₁	12 /12=	47.85	(39
leat loss para	meter (l	HLP), W	/m²K					(40)m	n = (39)m ÷	(4)	,	1	
10)	0.93	0.92	0.89	0.89	0.86	0.86	0.86	0.87	0.89	0.9	0.91		
40)m= 0.93	0.00		<u> </u>		Į	Į	ļ.	l .	Į	<u> </u>	ļ		

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. Wa	iter heat	ing ener	rgy requi	rement:								kWh/ye	ear:	
if TF	ed occu A > 13.9 A £ 13.9	0, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (T	ΓFA -13.		.8		(42)
Reduce	the annua	l average		usage by	5% if the a	lwelling is	designed t	(25 x N) to achieve		se target o		.83		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water	er usage ir	litres per	day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)					l	
(44)m=	84.52	81.44	78.37	75.3	72.22	69.15	69.15	72.22	75.3	78.37	81.44	84.52		
Energy o	content of	hot water	used - cal	culated mo	onthly = 4 .	190 x Vd,r	n x nm x D	OTm / 3600			m(44) ₁₁₂ = ables 1b, 1		921.99	(44)
(45)m=	125.33	109.62	113.12	98.62	94.63	81.66	75.67	86.83	87.86	102.4	111.77	121.38		
										Γotal = Su	m(45) ₁₁₂ =		1208.88	(45)
If instant	taneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46 ₎) to (61)				•	
(46)m= Water	18.8 storage	16.44 loss:	16.97	14.79	14.19	12.25	11.35	13.02	13.18	15.36	16.77	18.21		(46)
	_		includin	g any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0		(47)
Otherw Water	vise if no storage	stored loss:	ind no ta hot wate eclared l	er (this in	icludes i	nstantar	neous co	(47) ombi boil	ers) ente	er '0' in (0	l	(48)
,			m Table		51 10 11110	**** (1.000)	"day).					0		(49)
•			storage		ear			(48) x (49)) =			10		(50)
b) If m Hot wa	anufact ter stora	urer's de age loss	eclared of factor fr	ylinder l om Tabl	oss fact		known:	(10) 11 (10)				02		(51)
	nunity h e factor		ee secti	on 4.3									1	(50)
			bie ∠a m Table	2b								.6		(52) (53)
•			storage		ear			(47) x (51)	x (52) x (53) =		03		(54)
• • • • • • • • • • • • • • • • • • • •	(50) or (-	,				, , , ,		,	-	03		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)r	m			l	
(56)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinde	er contains	dedicate	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Primar	y circuit	loss (an	nual) fro	m Table	3							0		(58)
	-				•	•	. ,	65 × (41) ng and a		r thermo	stat)			
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi	loss cal	culated	for each	month ((61)m =	(60) ÷ 36	65 × (41))m					ı	
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat	required for	water he	eating ca	alculated	l for eac	h month	(62)m	i = 0.85 ×	(45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 180		168.39	152.11	149.9	135.15	130.94	142.		157.67	165.27	176.66		(62)
Solar DHW ir	put calculated	using App	endix G oı	· Appendix	H (negat	ive quantity	y) (ente	'0' if no sola	r contribu	tion to wate	er heating)		
(add additi	onal lines if	FGHRS	and/or \	vwhrs	applies	s, see Ap	pendi	(G)					
(63)m=	0	0	0	0	0	0	0	0	0	0	0		(63)
Output fror	n water hea	ter								-		•	
(64)m= 180).61 159.55	168.39	152.11	149.9	135.15	130.94	142.1	141.36	157.67	165.27	176.66		
	•						0	utput from w	ater heate	er (annual) ₁	12	1859.72	(64)
Heat gains	from water	heating,	kWh/m	onth 0.2	5 ´ [0.85	5 × (45)m	+ (61)m] + 0.8	x [(46)m	+ (57)m	+ (59)m]	
(65)m= 85	76.39	81.83	75.59	75.68	69.95	69.38	73.09	72.01	78.27	79.96	84.58		(65)
include ((57)m in cal	culation of	of (65)m	only if c	ylinder	is in the	dwellir	ng or hot w	ater is f	rom com	munity h	neating	
5. Interna	al gains (see	e Table 5	and 5a):									
Metabolic	gains (Table	e 5), Wat	ts										
	an Feb	Mar	Apr	May	Jun	Jul	Au	g Sep	Oct	Nov	Dec		
(66)m= 89	.75 89.75	89.75	89.75	89.75	89.75	89.75	89.75	89.75	89.75	89.75	89.75		(66)
Lighting ga	ins (calcula	ted in Ap	pendix	L, equat	ion L9 c	r L9a), a	lso se	e Table 5		-		•	
(67)m= 14	.43 12.82	10.42	7.89	5.9	4.98	5.38	7	9.39	11.92	13.91	14.83		(67)
Appliances	gains (calc	ulated in	Append	dix L, eq	uation L	.13 or L1	3a), a	so see Ta	ble 5	•		•	
(68)m= 156	6.47 158.09	154	145.29	134.29	123.96	117.06	115.4	3 119.52	128.23	139.23	149.56		(68)
Cooking ga	ains (calcula	ated in A	ppendix	L, equat	ion L15	or L15a), also	see Table	5	•	•	•	
(69)m= 31.	.98 31.98	31.98	31.98	31.98	31.98	31.98	31.98	31.98	31.98	31.98	31.98		(69)
Pumps and	d fans gains	(Table 5	Ба)			•	•	•	•	•	•	•	
(70)m=	0	0	0	0	0	0	0	0	0	0	0		(70)
Losses e.g	j. evaporatio	n (nega	tive valu	es) (Tab	le 5)			•		•		•	
(71)m= -7°	1.8 -71.8	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8		(71)
Water hea	ting gains (1	rable 5)						•		•		•	
(72)m= 115	5.45 113.68	109.99	104.98	101.73	97.15	93.25	98.24	1 100.01	105.2	111.06	113.68		(72)
Total inter	nal gains =	:			(66	5)m + (67)m	า + (68)เ	m + (69)m +	(70)m + (71)m + (72)	m	•	
(73)m= 336	334.51	324.34	308.09	291.85	276.01	265.62	270.5	9 278.85	295.28	314.13	328.01		(73)
6. Solar g	ains:												
Solar gains	are calculated	using sola	r flux from	Table 6a	and asso	ciated equa	tions to	convert to th	ne applica	ble orientat	ion.		
Orientation	n: Access F		Area		Flu			g_ Table Ch	7	FF		Gains	
	Table 6d		m ²		18	ble 6a	, –	Table 6b		able 6c		(W)	7
	.9x 0.77	X	8.9	95	X	19.64	X	0.63	x	0.7	=	53.72	(80)
	.9x 0.77	X	8.9	95	X	38.42	_ x _	0.63	×	0.7	=	105.09	(80)
	.9x 0.77	×	8.9	95	X	63.27	X	0.63	x	0.7	=	173.07	(80)
	.9x 0.77	X	8.9	95	Х	92.28	×	0.63	x	0.7	=	252.41	(80)
	.9x 0.77	X	8.9	95	X ·	13.09	×	0.63	×	0.7	=	309.34	(80)
	.9x 0.77	Х	8.9	95	x	15.77	x	0.63	x	0.7	=	316.66	(80)
	.9x 0.77	X	8.9	95	X	10.22	x	0.63	x	0.7	=	301.47	(80)
West 0	.9x 0.77	X	8.9	95	Х	94.68	x	0.63	X	0.7	=	258.96	(80)

West	0.9x	0.77	×	8.9	95	x	73.59	x		0.63	x	0.7	=	201.28	(80)
West	0.9x	0.77	x	8.9	95	x	45.59	_ x [0.63	x	0.7	=	124.7	(80)
West	0.9x	0.77	x	8.9)5	x	24.49	x		0.63	х	0.7	=	66.98	(80)
West	0.9x	0.77	×	8.9	95	x \lceil	16.15	x		0.63	x	0.7		44.18	(80)
	-					_									_
Solar	ains in	watts, ca	alculated	for eacl	h month			(83)m :	= Su	ım(74)m .	(82)m				
(83)m=	53.72	105.09	173.07	252.41	309.34	316	301.47	258.9	96	201.28	124.7	66.98	44.18]	(83)
Total g	ains – i	nternal a	nd solar	(84)m =	= (73)m -	+ (83	3)m , watts	•				•	•	•	
(84)m=	390	439.6	497.41	560.49	601.18	592	2.67 567.09	529.5	56	480.14	419.98	381.11	372.18		(84)
7. Me	an inter	nal temp	erature	(heating	season)									
				`			rea from Ta	ble 9	Th1	l (°C)				21	(85)
•		Ū	0.			•	e Table 9a)	5.0 0,		(0)				21	
Otilloc	Jan	Feb	Mar	Apr	May	È	un Jul	Au	аТ	Sep	Oct	Nov	Dec	1	
(86)m=	0.94	0.92	0.87	0.77	0.63	0.4		0.39	- +	0.59	0.81	0.91	0.95		(86)
. ,		l	I			<u> </u>	I	<u> </u>			0.01	0.01	0.00	J	()
							steps 3 to	1	-			1		1	(07)
(87)m=	19.31	19.57	19.97	20.45	20.77	20.	.94 20.98	20.9	7	20.86	20.44	19.83	19.3	J	(87)
Temp	erature	during h	eating p	eriods ir	rest of	dwe	lling from T	able 9	, Th	2 (°C)				_	
(88)m=	20.14	20.14	20.15	20.17	20.18	20	0.2 20.2	20.2	2	20.19	20.18	20.17	20.16		(88)
Utilisa	ation fac	tor for g	ains for r	est of d	welling,	h2,m	n (see Table	9a)							
(89)m=	0.93	0.91	0.85	0.74	0.59	0.4		0.32	2	0.54	0.79	0.9	0.94]	(89)
Moan	intorna	l tompor	ature in t	ho rost	of dwalli	na T	2 (follow st	one 3 i	<u> </u>	in Tabl	0.00			J	
(90)m=	17.88	18.25	18.82	19.5	19.92	20.	<u>`</u>	20.1	-	20.05	19.5	18.64	17.88	1	(90)
(00)		10.20	10.02		.0.02			1				g area ÷ (4		0.46	(91)
												5	,	0.40	(0.7
) = fLA × T1	_	$\overline{}$				T	1	(00)
(92)m=	18.55	18.86	19.35	19.94	20.31	20.		20.5		20.43	19.93	19.19	18.54		(92)
		r	T		· ·	1	e from Table	1	-		•	10.40	T 40.54	1	(02)
(93)m=	18.55	18.86	19.35	19.94	20.31	20.	.51 20.55	20.5	5	20.43	19.93	19.19	18.54		(93)
		ting requ						T-1-1-	01	11	· T ' /'	70)	.1		
			ernai ten or gains t			ied a	at step 11 o	rabie	90	, so tha	t 11,m=(76)m an	d re-caid	culate	
	Jan	Feb	Mar	Apr	May	J.	un Jul	Au	a T	Sep	Oct	Nov	Dec	1	
Utilisa			ains, hm	•	may		un un	1	9	ООР		1.00	1 200	ı	
(94)m=	0.92	0.89	0.83	0.73	0.6	0.4	44 0.32	0.35	5	0.56	0.78	0.89	0.93]	(94)
Usefu	ıl gains,	hmGm ,	W = (94)	l)m x (84	4)m	!	!						!	J	
(95)m=	357.82	390.62	414.54	410.37	359.38	259	9.44 179.05	185.5	54	266.81	325.93	337.3	344.31]	(95)
Month	nly aver	age exte	rnal tem	perature	from Ta	able	8	•				ļ.		J	
(96)m=	4.3	4.9	6.5	8.9	11.7	14	16.6	16.4	1	14.1	10.6	7.1	4.2]	(96)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm ,	W =[(39)m	x [(93)m–	- (96)m]	•	•	•	
(97)m=	712.11	693.57	634.79	529.16	410.14	272	2.77 182.57	190.4	41	295.78	444.56	582.87	699.75]	(97)
Space	e heatin	g require	ement for	r each n	nonth, k\	//h/r	month = 0.0	24 x [(97)ı	m – (95)m] x (4	1)m	•	•	
(98)m=	263.59	203.58	163.87	85.52	37.76		0	0		0	88.26	176.81	264.45		
								Т	otal	per year	(kWh/year	r) = Sum(9	8)15,912 =	1283.84	(98)
Space	e heatin	a reauire	ement in	kWh/m²	?/vear									23.97	(99)
- 1 5		J - 1		,	,										」 ` ′

9b. Energy requirements – Community heating scheme				
This part is used for space heating, space cooling or water heating Fraction of space heat from secondary/supplementary heating (Tab			0	(301)
Fraction of space heat from community system 1 – (301) =			1	(302)
The community scheme may obtain heat from several sources. The procedure allow includes boilers, heat pumps, geothermal and waste heat from power stations. See		four other heat sources; t	the latter	_
Fraction of heat from Community boilers			0.4	(303a)
Fraction of community heat from heat source 2			0.4	(303b)
Fraction of total space heat from Community boilers		(302) x (303a) =	0.4	(304a)
Fraction of total space heat from community heat source 2		(302) x (303b) =	0.4	(304b)
Factor for control and charging method (Table 4c(3)) for community	y heating system		1	(305)
Distribution loss factor (Table 12c) for community heating system			1.05	(306)
Space heating Annual space heating requirement			kWh/yea 1283.84	r
Space heat from Community boilers	(98) x (304a)	x (305) x (306) =	539.21	(307a)
Space heat from heat source 2	(98) x (304b)	x (305) x (306) =	539.21	(307b)
Efficiency of secondary/supplementary heating system in % (from	Γable 4a or Appe	endix E)	0	(308
Space heating requirement from secondary/supplementary system	(98) x (301) x	100 ÷ (308) =	0	(309)
Water heating Annual water heating requirement If DHW from community scheme:			1859.72	
Water heat from Community boilers	(64) x (303a)	x (305) x (306) =	781.08	(310a)
Water heat from heat source 2	(64) x (303b)	x (305) x (306) =	781.08	(310b)
Electricity used for heat distribution	0.01 × [(307a)(3	07e) + (310a)(310e)] =	26.41	(313)
Cooling System Energy Efficiency Ratio			0	(314)
Space cooling (if there is a fixed cooling system, if not enter 0)	= (107) ÷ (31	4) =	0	(315)
Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from out	side		195.54	(330a)
warm air heating system fans			0	(330b)
pump for solar water heating			0	(330g)
Total electricity for the above, kWh/year	=(330a) + (33	30b) + (330g) =	195.54	(331)
Energy for lighting (calculated in Appendix L)			254.88	(332)
Electricity generated by PVs (Appendix M) (negative quantity)			-522.64	(333)
Electricity generated by wind turbine (Appendix M) (negative quant	ity)		0	(334)
12b. CO2 Emissions – Community heating scheme				
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
CO2 from other sources of space and water heating (not CHP) Efficiency of heat source 1 (%) If there is CHP using two	o fuels repeat (363)	to (366) for the second fue	89	(367a)

Efficiency of heat source 2 (%)	If there is CHP using two fuels repeat (363) to (363)	366) for the second fu	ıel	89	(367b)
CO2 associated with heat source 1	[(307b)+(310b)] x 100 ÷ (367b) x	0.22	=	320.43	(367)
CO2 associated with heat source 2	[(307b)+(310b)] x 100 ÷ (367b) x	0.22	=	320.43	(368)
Electrical energy for heat distribution	[(313) x	0.52	=	13.7	(372)
Total CO2 associated with community system	ns (363)(366) + (368)(372)		=	654.57	(373)
CO2 associated with space heating (secondary	(309) x	0	=	0	(374)
CO2 associated with water from immersion h	eater or instantaneous heater (312) x	0.22	=	0	(375)
Total CO2 associated with space and water h	neating (373) + (374) + (375) =			654.57	(376)
CO2 associated with electricity for pumps and	d fans within dwelling (331)) x	0.52	=	101.49	(378)
CO2 associated with electricity for lighting	(332))) x	0.52	=	132.28	(379)
Energy saving/generation technologies (333)	` ′ ''	004	_		1
Item 1		0.52 x 0.01 =	L	-271.25	(380)
Total CO2, kg/year sum o	of (376)(382) =			617.08	(383)
Dwelling CO2 Emission Rate (383)	÷ (4) =			11.52	(384)
El rating (section 14)				91.61	(385)

		User D	etails:						
Assessor Name:	John Ashe		Strom	a Num	her:		STRO	031268	
Software Name:	Stroma FSAP 2012		Softwa					n: 1.0.5.8	
		Property .	Address	Unit 39	- COPF	PETTS V	VOOD, L	ondon.	
Address :									
1. Overall dwelling dime	ensions:								
Ground floor			a(m²)	(4-)		ight(m)	7(0-)	Volume(m³	<u>^</u>
			3.56	(1a) x	2	.66	(2a) =	142.47	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 5	53.56	(4)					
Dwelling volume				(3a)+(3b)+(3c)+(3c	d)+(3e)+	(3n) =	142.47	(5)
2. Ventilation rate:			41					2 1	
	main seconda heating heating	iry 	other	_	total			m³ per hou	r
Number of chimneys	0 + 0	+	0] = [0	X	40 =	0	(6a)
Number of open flues	0 + 0	+	0] = [0	X	20 =	0	(6b)
Number of intermittent fa	ins				2	X	10 =	20	(7a)
Number of passive vents	;			Ī	0	x	10 =	0	(7b)
Number of flueless gas fi	ires			Ī	0	x	40 =	0	(7c)
				_					
							Air ch	anges per ho	our
·	ys, flues and fans = $(6a)+(6b)+$				20		÷ (5) =	0.14	(8)
If a pressurisation test has b Number of storeys in the	peen carried out or is intended, proce	ed to (17), o	otherwise (continue fr	om (9) to	(16)			(9)
Additional infiltration	ne aweiling (ns)					[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0	.25 for steel or timber frame of	or 0.35 fo	r masoni	y constr	uction	,	•	0	(11)
•••	resent, use the value corresponding	to the great	ter wall are	a (after					
deducting areas of opening	^{ngs); if equal user 0.35 floor, enter 0.2 (unsealed) or (}) 1 (seale	ed) else	enter 0				0	(12)
If no draught lobby, en	,	311 (00 0.10	, o.oo	00. 0				0	(13)
• ,	s and doors draught stripped							0	(14)
Window infiltration			0.25 - [0.2	x (14) ÷ 1	00] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13)	+ (15) =		0	(16)
• •	q50, expressed in cubic metr	•	•	•	etre of e	envelope	area	5	(17)
•	lity value, then $(18) = [(17) \div 20] +$							0.39	(18)
Air permeability value applie Number of sides sheltere	es if a pressurisation test has been do ad	one or a deg	gree air pe	rmeability	is being u	sed		0	(19)
Shelter factor	su .		(20) = 1 -	[0.0 75 x (1	19)] =			0	(20)
Infiltration rate incorporat	ting shelter factor		(21) = (18) x (20) =				0.39	(21)
Infiltration rate modified f	or monthly wind speed								
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Table 7								
(22)m= 5.1 5	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2	2)m <i>÷ 1</i>								
	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
(===)	1.00 0.00	1 3.00	1 3.02	· ·		1	1	I	

Adjusted infilt	ration rat	e (allowi	ing for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
0.5	0.49	0.48	0.43	0.42	0.37	0.37	0.36	0.39	0.42	0.44	0.46]	
Calculate effe		-	rate for t	he appli	cable ca	se							
If mechanic			andiv N (2	3h) - (23s	a) v Emy (e	aguation (1	VSV) other	nvica (23h	n) = (23a)			0	(23
If balanced wit		0		, ,	,	. ,	,, .	,) = (25a)			0	(23
		•	•	ŭ		,			Ob\ma . //	00k) f	4 (00.0)	0	(23
a) If balanc (24a)m= 0		anicai ve	ntilation	with ne	at recove		7R) (248	i)m = (2.	26)m + (. 0	23b) × [$\frac{1 - (230)}{0}$	1 ÷ 100]]	(24
` ′												J	(2-1
b) If balanc (24b)m= 0		anicai ve	o liation	without	neat rec	overy (r	0 (240	$\frac{1}{0}$	26)m + (2 0	230)	0	1	(24
` '						<u> </u>			0	0		J	(2
c) If whole I	nouse ex m < 0.5 >			•	•				5 × (23h	.)			
$\frac{11(225)}{(24c)m} = 0$	0.07	0	0	0	0	0	0) = (22)	0	0	0	0	1	(24
d) If natural		·										J	•
,	m = 1, th			•					0.5]				
(24d)m= 0.62	0.62	0.61	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.6	0.61]	(24
Effective air	r change	rate - er	nter (24a	or (24k	o) or (24	c) or (24	d) in box	(25)					
(25)m= 0.62	0.62	0.61	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.6	0.61]	(25
					1		1					1	
3. Heat losse	_	•											
ELEMENT	Gros area		Openin m		Net Ar A ,r		U-valı W/m2		A X U (W/I	<)	k-value kJ/m²-l		AXk :J/K
Windows					8.95	x1	/[1/(1.4)+	0.04] =	11.87	Ì			(27
Walls	27.4	13	8.95	;	18.48	x	0.18		3.33	=			(29
Roof	53.6	31	0	=	53.61	x	0.13	= =	6.97	=		=	(30
Total area of	L				81.04	=							1` (31
* for windows an			effective wi	ndow U-va			formula 1	/[(1/U-valu	ue)+0.04] a	ıs given in	paragraph	n 3.2	(0)
** include the are									, ,	J	, , ,		
abric heat lo	ss, W/K	= S (A x	U)				(26)(30)	+ (32) =				22.16	(33
Heat capacity	Cm = S	$(A \times k)$						((28).	(30) + (32	2) + (32a).	(32e) =	1108.8	(34
Thermal mass	s parame	ter (TMF	o = Cm ÷	- TFA) ir	n kJ/m²K			Indica	ative Value:	Medium		250	(35
For design asses				construct	ion are no	t known pr	ecisely the	indicative	e values of	TMP in T	able 1f		
can be used inst				.a.:.a. A.:	ا براد می می	,							
Thermal bridg	`	,		Ο.	•	`						4.05	(36
if details of therm Total fabric he		are not kn	OWII (30) =	= 0.03 X (3	(1)			(33) +	- (36) =			26.21	(37
Ventilation he		alculated	d monthly	/					n = 0.33 × (25)m x (5)	20.21	(o.
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1	
(38)m= 29.33	29.11	28.88	27.84	27.65	26.74	26.74	26.57	27.09	27.65	28.04	28.45	1	(38
, L		<u> </u>			L		L		ļ.		1	J	•
Heat transfer	_	1	E4.06	E2 06	E2 0E	E2 0E	52.79	(39)m 53.3	1 = (37) + (37)		54.67	1	
39)m= 55.54	55.32	55.1	54.06	53.86	52.95	52.95	52.79		53.86	54.25		E4.0E	(39
	ameter (l	HP) W	/m²K						Average = $1 = (39) \text{m} \div 1$		12 / IZ=	54.05	(38
Heat loss par	annetei (i	'LL' /, VV/	1111 11										
Heat loss para (40)m= 1.04	1.03	1.03	1.01	1.01	0.99	0.99	0.99	1	1.01	1.01	1.02]	

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. Wa	ter heat	ing ener	rgy requi	rement:								kWh/ye	ear:	
if TF	ed occu A > 13.9 A £ 13.9	, N = 1	N + 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (T	ΓFA -13.		.8		(42)
Reduce	the annua	l average	ater usag hot water person per	usage by	5% if the a	lwelling is	designed			se target o		.83		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate		litres per	day for ea		Vd,m = fa	ctor from T	Table 1c x	(43)						
(44)m=	84.52	81.44	78.37	75.3	72.22	69.15	69.15	72.22	75.3	78.37	81.44	84.52		¬
Energy o	content of	hot water	used - cal	culated mo	onthly = 4.	190 x Vd,r	n x nm x E	OTm / 3600			m(44) ₁₁₂ = ables 1b, 1		921.99	(44)
(45)m=	125.33	109.62	113.12	98.62	94.63	81.66	75.67	86.83	87.86	102.4	111.77	121.38		_
If instant	aneous wa	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =	•	1208.88	(45)
(46)m=	18.8	16.44	16.97	14.79	14.19	12.25	11.35	13.02	13.18	15.36	16.77	18.21		(46)
	storage													
_		, ,	includin				•		ame ves	sel		150		(47)
	•	_	ind no ta hot wate		-			, ,	ers) ente	er '0' in (47)			
Water	storage	loss:												
a) If m	anufactu	urer's de	eclared l	oss facto	or is kno	wn (kWh	n/day):				1.	39		(48)
Tempe	rature fa	actor fro	m Table	2b							0.	54		(49)
• • • • • • • • • • • • • • • • • • • •			storage	-		!+		(48) x (49)) =		0.	75		(50)
			eclared of factor fr	-								0		(51)
		-	ee secti		<u> </u>	., 0, 0.0	.,,					0		(01)
Volum	e factor f	rom Ta	ble 2a									0		(52)
Tempe	rature fa	actor fro	m Table	2b								0		(53)
• • • • • • • • • • • • • • • • • • • •			storage	, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(54)
	(50) or (, ,	,								0.	75		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)r	m 				
(56)m=	23.33	21.07	23.33	22.58	23.33	22.58	23.33	23.33	22.58	23.33	22.58	23.33		(56)
If cylinde	er contains	dedicate	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	23.33	21.07	23.33	22.58	23.33	22.58	23.33	23.33	22.58	23.33	22.58	23.33		(57)
	•	`	nual) fro									0		(58)
	•		culated from Tab		,		,	, ,		r thermo	stat)			
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi	loss cal	culated	for each	month ((61)m =	(60) ÷ 36	65 × (41))m						
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total he	eat requ	uired for	water	hea	ating ca	alculate	d fo	or eacl	h month	(62)	m =	0.85 × (45)m	+ (46)m +	(57)m	+ (59)m + (61)m	
(62)m=	171.93	151.7	159.71		143.71	141.22	1	26.75	122.26	133	.42	132.96	148.9	9 156.87	167.97	7	(62)
Solar DH	IW input o	calculated	using Ap	pe	ndix G or	Append	ix H	(negati	ve quantity	/) (ent	ter '0'	if no solar	contrib	oution to wate	er heatin	 g)	
(add ad	dditiona	l lines if	FGHR	S a	and/or V	VWHR	S a	pplies	, see Ap	pend	xik	3)					
(63)m=	0	0	0		0	0		0	0	C)	0	0	0	0		(63)
Output	from w	ater hea	ter											-		_	
(64)m=	171.93	151.7	159.71	T	143.71	141.22	1	26.75	122.26	133	.42	132.96	148.9	9 156.87	167.97	<i>,</i>]	
_			•	•						•	Outp	ut from wa	ater hea	iter (annual)	112	1757.49	(64)
Heat ga	ains froi	m water	heatin	g, I	kWh/mo	onth 0.2	25 ´	[0.85	× (45)m	+ (6	31)m	ı] + 0.8 x	[(46)	m + (57)m	+ (59)	m]	
(65)m=	78.95	70.12	74.89		68.86	68.74	1	63.22	62.43	66.	15	65.29	71.32	2 73.24	77.63	7	(65)
includ	de (57)ı	m in cald	culation	n of	f (65)m	only if	cyli	nder is	s in the o	dwell	ling	or hot wa	ater is	from com	munity	_ heating	
		ains (see															
		s (Table			,												
IVICTADO [Jan	Feb	Mar	Т	Apr	May		Jun	Jul	Α	ug	Sep	Oc	Nov	Dec	<u>.</u>	
(66)m=	89.75	89.75	89.75	\dagger	89.75	89.75	+	39.75	89.75	89.		89.75	89.7	-	89.75	_	(66)
L Liahtina	g gains	(calcula	ted in A	L Apr	oendix l	egua	tion	1 L9 oi	∟—— r L9a), a	lso s	ee -	 Гable 5		<u> </u>		_	
(67)m=	14.43	12.82	10.42		7.89	5.9	_	4.98	5.38	7		9.39	11.92	2 13.91	14.83	\neg	(67)
L			<u> </u>				nua L	tion I	l	3a)	ا معاد	see Tab			I	_	
	156.47	158.09	154	_	145.29	134.29	÷	23.96	117.06	115	_	119.52	128.2	3 139.23	149.56	$\overline{1}$	(68)
` ' L			<u> </u>						<u> </u>	<u> </u>		e Table		0 100.20	1 10.00		()
(69)m=	31.98	31.98	31.98	Ť	31.98	31.98	_	31.98	31.98	31.		31.98	31.98	31.98	31.98	П	(69)
L			<u> </u>			31.90	Т,	31.90	31.90	31.	30	31.90	31.30	31.90	31.90		(00)
(70)m=	3	ns gains 3	(1 abie	T	3	3	T	3	3	3	,	3	3	3	3	\neg	(70)
L			<u> </u>				<u> </u>		3		,	3	3] 3		_	(10)
г		aporatio	n (neg -71.8	ativ	ve value		$\overline{}$		74.0	-71		74.0	74.0	-71.8	74.0	\neg	(71)
(71)m=	-71.8		<u> </u>		-/ 1.0	-71.8		-71.8	-71.8	-/	1.0	-71.8	-71.8	-/1.0	-71.8		(7-1)
_		gains (T					Т.								1	_	(70)
L		104.34		<u> </u>	95.64	92.39		37.81	83.92	88.		90.68	95.86			<u>'</u>	(72)
г		gains =		_			T .				_	` '		(71)m + (72			(70)
` ′			318		301.75	285.51	2	69.68	259.28	264	.26	272.52	288.9	5 307.79	321.67		(73)
	ar gains				fl fue as	Tabla Ca				4:	4		!:		t:		
•			•	iar		rable 6a	anc			tions	10 CO		е аррію	able orienta FF	tion.	Gains	
Onenia		Access F able 6d			Area m²			Flu Tal	x ole 6a		Т	g_ able 6b		Table 6c		(W)	
West	0.9x	0.77		x	8.9	5	X	1	9.64	x		0.63	x	0.7		53.72	(80)
West	0.9x	0.77		x	8.9	5	X	3	8.42	x		0.63	x	0.7		105.09	(80)
West	0.9x	0.77		x İ	8.9	5	X	6	3.27	x		0.63	×	0.7		173.07	(80)
West	0.9x	0.77		x	8.9	5	X	9	2.28	x		0.63	x	0.7		252.41	(80)
West	0.9x	0.77		х	8.9	5	X	1	13.09	x		0.63	x	0.7		309.34	(80)
West	0.9x	0.77		x	8.9	5	X	1	15.77	X		0.63	X	0.7		316.66	(80)
West	0.9x	0.77		x	8.9	5	X	1	10.22	X		0.63	X	0.7	╡ -	301.47	(80)
West	0.9x	0.77		x	8.9		X	_	4.68	X		0.63	X	0.7			(80)
	L			ı									_				_

West	0.9x	0.77	X	8.9	95	x	7	3.59	x		0.63	х	0.7	=	201.28	(80)
West	0.9x	0.77	x	8.9)5	X	4	5.59	x		0.63	_ x _	0.7	_ =	124.7	(80)
West	0.9x	0.77	X	8.9)5	x	2	4.49	x		0.63	x	0.7	=	66.98	(80)
West	0.9x	0.77	X	8.9)5	x	1	6.15	х		0.63	_ x _	0.7	=	44.18	(80)
	-															
Solar	gains in	watts, ca	alculated	I for eacl	h month				(83)m	= St	um(74)m .	(82)m				
(83)m=	53.72	105.09	173.07	252.41	309.34	3	16.66	301.47	258.	.96	201.28	124.7	66.98	44.18		(83)
Total g	ains – i	nternal a	nd solar	(84)m =	= (73)m ·	+ (83)m	, watts	•				!	!		
(84)m=	383.66	433.26	491.07	554.16	594.85	5	86.34	560.75	523.	.22	473.8	413.64	374.77	365.85		(84)
7. Me	an inter	nal temp	erature	(heating	season)										
		during h		·			area 1	from Tab	ole 9.	Th	1 (°C)				21	(85)
•		tor for g	٠.			·			,		()					` ′
Cuno	Jan	Feb	Mar	Apr	May	È	Jun	Jul	Aı	ug	Sep	Oct	Nov	Dec		
(86)m=	1	0.99	0.97	0.91	0.77	⊢	0.57	0.41	0.4	Ť	0.73	0.94	0.99	1		(86)
, ,						_										, ,
		l temper										00.00	00.04	00.04	1	(07)
(87)m=	20.02	20.17	20.42	20.73	20.92	<u> </u>	20.99	21	21	1	20.96	20.69	20.31	20.01		(87)
Temp	erature	during h	eating p	eriods ir	rest of	dw	elling	from Ta	able 9), Tr	n2 (°C)				•	
(88)m=	20.05	20.06	20.06	20.08	20.08	2	20.09	20.09	20.	.1	20.09	20.08	20.07	20.07		(88)
Utilisa	ation fac	tor for g	ains for	rest of d	welling,	h2	,m (se	e Table	9a)							
(89)m=	0.99	0.99	0.96	0.88	0.71		0.49	0.33	0.3	7	0.65	0.92	0.99	1		(89)
Mean	interna	l temper	ature in	the rest	of dwelli	ina	T2 (f	allow ste	ns 3	to 7	7 in Tahl	e 9c)				
(90)m=	18.76	18.98	19.34	19.77	20.01	Ť	20.09	20.09	20.0		20.06	19.74	19.19	18.74		(90)
, ,									<u> </u>		f	LA = Livin	g area ÷ (4	<u>1</u> 4) =	0.46	(91)
									,,				•		00	` ′
		l temper										00.40	40.74	40.00	1	(92)
(92)m=	19.34	19.53	19.84	20.22	20.43		20.5	20.51	20.5		20.47	20.18	19.71	19.33		(92)
(93)m=	19.34	nent to th	ne mear 19.84	20.22	20.43	т —	20.5	m Table 20.51	20.5		20.47	20.18	19.71	19.33]	(93)
					20.43	<u>L</u>	20.5	20.51	20.3	31	20.47	20.10	19.71	19.55		(55)
		iting requ mean int			ro obtair	000	l at et	on 11 of	Tabl	o Oh	o co tha	t Ti m_/	76)m an	d ro-calc	culato	
		factor fo		•		100	aisi	эр ттог	Table	C JL), 30 tila		r Ojili ali	u re-caic	Julate	
	Jan	Feb	Mar	Apr	May		Jun	Jul	Αι	ug	Sep	Oct	Nov	Dec		
Utilisa	ation fac	tor for g	ains, hm	<u> </u>		_				<u> </u>					l	
(94)m=	0.99	0.98	0.96	0.89	0.73		0.53	0.37	0.4	1	0.68	0.93	0.98	0.99		(94)
Usefu	ıl gains,	hmGm ,	W = (94	4)m x (84	4)m											
(95)m=	380.69	426.6	471.96	491.41	436.73	3	08.49	206.72	216.	.26	323.25	382.71	368.73	363.6		(95)
Montl	nly aver	age exte	rnal tem	perature	from Ta	abl	e 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)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm	ı , W =	=[(39)m :	x [(93	3)m-	– (96)m]			•	
(97)m=	835.65	809.42	735.14	611.69	470.19	3	12.65	207.18	217	'.1	339.72	516.09	684.2	827.01		(97)
Space	e heatin	g require	ement fo	r each n	nonth, k	Wh	/mont	h = 0.02	24 x [(97)	m – (95)m] x (4	1)m			
(98)m=	338.49	257.25	195.8	86.61	24.89		0	0	0		0	99.24	227.14	344.77		_
									•	Total	per year	(kWh/yeaı	r) = Sum(9	8) _{15,912} =	1574.19	(98)
Space	e heatin	g require	ement in	kWh/m²	/year										29.39	(99)
•		•			-										L	_

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
	93.5 (206
Efficiency of secondary/supplementary heating system, %	0 (208
	kWh/year
Space heating requirement (calculated above)	
338.49 257.25 195.8 86.61 24.89 0 0 0 0 99.24 227.14 344.77	
$ (211) m = \{ [(98) m \times (204)] \} \times 100 \div (206) $	(211
362.02 275.14 209.41 92.63 26.62 0 0 0 106.14 242.93 368.74 Total (kWh/year) =Sum(211) ₁₅₁₀₁₂ = 16	200.00 (04.4
	683.62 (211
Space heating fuel (secondary), kWh/month = {[(98)m x (201)] } x 100 ÷ (208)	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
Total (kWh/year) =Sum(215) _{15,1012} =	0 (215
Water heating	
Output from water heater (calculated above)	
171.93 151.7 159.71 143.71 141.22 126.75 122.26 133.42 132.96 148.99 156.87 167.97	
	79.8 (216
(217)m= 86.59 86.21 85.36 83.51 81.24 79.8 79.8 79.8 79.8 83.76 85.8 86.69	(217
Fuel for water heating, kWh/month (219)m = (64)m x 100 ÷ (217)m	
(219)m= 198.56 175.97 187.11 172.08 173.83 158.83 153.21 167.2 166.61 177.88 182.83 193.76	
Total = Sum(219a) ₁₁₂ = 21	07.86 (219
	Nh/year
Space heating fuel used, main system 1	883.62
Water heating fuel used 21	07.86
Electricity for pumps, fans and electric keep-hot	
central heating pump:	(230
boiler with a fan-assisted flue	(230
Total electricity for the above, kWh/year sum of (230a)(230g) =	
Electricity for lighting	54.88 (232
12a. CO2 emissions – Individual heating systems including micro-CHP	
3 ,	issions CO2/year
	63.66 (261
Space heating (main system 1) (211) x 0.216 = 30	
0.210 0.210	0 (263
Space heating (secondary) (215) x (215) x	0 (263
Space heating (secondary) (215) x (215) x	0 (263 55.3 (264 18.96 (265

Electricity for pumps, fans and electric keep-hot $(231) \times 0.519 = 38.93 (267)$ Electricity for lighting $(232) \times 0.519 = 132.28 (268)$ Total CO2, kg/year sum of (265)...(271) = 990.17 (272)

TER = 18.49 (273)

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 07 October 2020

Property Details: Unit 39 - COPPETTS WOOD, London

Dwelling type:FlatLocated in:EnglandRegion:Thames valley

Cross ventilation possible:YesNumber of storeys:1Front of dwelling faces:North

Overshading: Average or unknown

Overhangs: None

Thermal mass parameter: Indicative Value Low

Night ventilation: False

Blinds, curtains, shutters:

Ventilation rate during hot weather (ach):4 (Windows open half the time)

Overheating Details:

Summer ventilation heat loss coefficient: 188.06 (P1)

Transmission heat loss coefficient: 29.7

Summer heat loss coefficient: 217.73 (P2)

Overhangs:

Orientation: Ratio: Z_overhangs:

West (Left Windows) 0 1

Solar shading:

Orientation:Z blinds:Solar access:Overhangs:Z summer:West (Left Windows)10.910.9

Solar gains:

Orientation FF Area Flux Shading Gains g_{-} 0.9 375.67 West (Left Windows) 0.9 x8.95 117.51 0.63 0.7 **Total** 375.67 (P3/P4)

Internal gains:

June July **August** 378.08 Internal gains 364.88 371.48 776.87 740.56 701.99 (P5) Total summer gains Summer gain/loss ratio 3.57 3.4 3.22 (P6) Mean summer external temperature (Thames valley) 16 17.9 17.8 Thermal mass temperature increment 1.3 1.3 1.3 (P7) Threshold temperature 20.87 22.6 22.32 Likelihood of high internal temperature Slight Medium Medium

Assessment of likelihood of high internal temperature: Medium