		User De	etails:						
Assessor Name:	Robyn Berry	•	Stroma	a Num	ber:		STRO	036659	
Software Name:	Stroma FSAP 2012		Softwa	re Vei	rsion:		Versio	n: 1.0.5.16	
	P	Property A	\ddress:	G05 BF	P Finchle	ey Rd			
Address :	G05 BP Finchley Rd, Londo	on, NW3 5	5EY						
1. Overall dwelling dime	nsions:								
0		Area				ight(m)	<b>1</b>	Volume(m³)	_
Ground floor		99	9.23	(1a) x	2	.54	(2a) =	252.04	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e)+(1ı	n) 99	9.23	(4)					
Dwelling volume				(3a)+(3b)	)+(3c)+(3c	d)+(3e)+	.(3n) =	252.04	(5)
2. Ventilation rate:									
	main secondar heating heating	ry c	other		total			m³ per hou	٢
Number of chimneys		+	0	= [	0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	T + [	0	=	0	x2	20 =	0	(6b)
Number of intermittent fa	ns				0	x ′	10 =	0	(7a)
Number of passive vents				Ī	0	x ′	10 =	0	(7b)
Number of flueless gas fi	res			Ī	0	X 4	40 =	0	(7c)
				_			'		_
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+(7a)$	7a)+(7b)+(7	(c) =		0		÷ (5) =	0	(8)
	een carried out or is intended, procee	ed to (17), ot	therwise c	ontinue fr	om (9) to (	(16)			_
Number of storeys in the	ne dwelling (ns)					r(0)	47.04	0	(9)
Additional infiltration	25 for steel or timber from a	. 0 25 for	maaanr	v oonotr	untion	[(9)-	-1]x0.1 =	0	(10)
	.25 for steel or timber frame or resent, use the value corresponding to			•	uction			0	(11)
deducting areas of openir		o uno grouto	a. o.	a (artor					
If suspended wooden f	floor, enter 0.2 (unsealed) or 0	.1 (sealed	d), else	enter 0				0	(12)
If no draught lobby, en	•							0	(13)
-	s and doors draught stripped							0	(14)
Window infiltration			0.25 - [0.2	. ,	-			0	(15)
Infiltration rate		•	. , , ,	, , ,	2) + (13) -	, ,		0	(16)
•	q50, expressed in cubic metre	•	•	•	etre of e	envelope	area	3	(17)
•	ity value, then $(18) = [(17) \div 20] + ($				:- h-::			0.15	(18)
Number of sides sheltere	es if a pressurisation test has been don ad	ne or a degr	ree air pei	теаршту	is being u	sea		2	(19)
Shelter factor	·u	(	(20) = 1 - [	0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporat	ing shelter factor	(	(21) = (18)	x (20) =				0.12	(21)
Infiltration rate modified for	_							0.12	` ′
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed 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 Faster (00s) (00	2)				•	•		•	
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		
(22a)m= 1.27 1.25	1.20 1.1 1.00 0.95	0.90	0.92	ı	1.08	1.12	1.10		

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

djusted infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m	_				
0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14		
<i>alcul<mark>ate effe</mark></i> If mechanica		•	rate for t	пе арри	саріе са	se						0.5	
If exhaust air h			endix N, (2	3b) = (23a	a) × Fmv (e	equation (I	N5)) , othe	rwise (23b	) = (23a)			0.5	_
If balanced with	h heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (fron	n Table 4h	) =				76.5	=
a) If balance	ed mecha	anical ve	entilation	with he	at recove	erv (MVI	HR) (24a	a)m = (2:	2b)m + (	23b) <b>x</b> [	1 – (23c)		
la)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		
b) If balance	ed mech	ı——— anical v∈	entilation	without	heat red	coverv (N	MV) (24t	m = (22)	2b)m + (	23b)	1		
lb)m= 0	0	0	0	0	0	0	0	0	0	0	0		
c) If whole h	ouse ex	tract ver	ntilation o	or positiv	re input v	ventilatio	on from (	utside	!	!	1		
,		< (23b), t			•				.5 × (23b	o)			
-c)m= 0	0	0	0	0	0	0	0	0	0	0	0		
d) If natural		on or wh en (24d)		•	•				0.51				
d)m= 0	0	0 0	0	0	0	0	0.0 1 [(2	0	0.01	0	0		
Effective air	change	rate - er	ter (24a	) or (24b	o) or (24	c) or (24	d) in bo	(25)	ļ		ļ		
i)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		
										<u> </u>	l		
. Heat losse LEMENT	Gros area	SS	Openin m	gs	Net Ar A ,r		U-val		A X U (W/		k-value kJ/m²-ł		X k J/K
ors		, ,			2.1	x	1.2	=	2.52	,			
indows Type	e 1				14.75	8 x1	/[1/( 0.9 )+	0.04] =	12.82				
ndows Type	e 2				1.667		/[1/( 0.9 )+	0.04] =	1.45				
oor					99.22	8 X	0.1	i	9.9228			<b>–</b>	
alls Type1	46.2	24	16.43	3	29.81	=	0.15	_	4.47	<b>=</b>		i	$\exists$
alls Type2	61		2.1		58.9		0.14	╡ :	8.33	<b>=</b>		╡┝	퓜
otal area of e					206.4		0.11		0.00				
irty wall		,			22.69	<b>=</b>	0		0	— r			
arty wall					99.23				U	[		$\exists \vdash \vdash$	=
or windows and	l roof wind	OWS USE 6	effective wi	ndow H-va			n formula 1	/[(1/Ll-valu	ıe)+0 041 a	] as aiven in	naragranh	 132	
nclude the area						aroa aomig	,	, <sub>[( 1</sub> , 0	.0, .0.0 ., 0	g	. paragrapi		
bric heat los	ss, W/K :	= S (A x	U)				(26)(30)	+ (32) =				39.52	
eat capacity	Cm = S(	(A x k )						((28).	(30) + (3	2) + (32a).	(32e) =	16762.62	
ermal mass	parame	ter (TMF	P = Cm -	- TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	
r design asses: n be used inste				construct	ion are no	t known pi	recisely the	e indicative	e values of	TMP in T	able 1f		
ermal bridge	es : S (L	x Y) cal	culated (	using Ap	pendix I	<						6.56	
letails of therma		are not kn	own (36) =	= 0.05 x (3	1)								
tal fabric he								(33) +	(36) =			46.07	
	at loss ca		l monthly		1	1		<del>- ` ´</del>	= 0.33 × (	(25)m x (5)	, 	ı	
entilation hea			l Anr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Jan	Feb	Mar	Apr	iviay	-	<b>i</b>	<del>†                                    </del>	<u> </u>	i e	î e	<del>                                     </del>		
	Feb 21.86	21.62	20.41	20.17	18.96	18.96	18.72	19.44	20.17	20.65	21.13		
Jan	21.86	21.62			-	18.96	18.72	<u> </u>	20.17	ļ.	<del>                                     </del>		

eat lo	ss para	meter (H	HLP), W	m²K					(40)m	= (39)m ÷	- (4)			
))m=	0.69	0.68	0.68	0.67	0.67	0.66	0.66	0.65	0.66	0.67	0.67	0.68		
ımbo	r of dov	o in mor	oth (Tob	lo 1o\					,	Average =	Sum(40) <sub>1</sub>	12 /12=	0.67	(
-   	Jan	Feb	nth (Tab Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
)m=	31	28	31	30	31	30	31	31	30	31	30	31		(
′ L														·
. Wa	ter heat	ing ener	gy requi	rement:								kWh/ye	ear:	
		ipancy, I		F.4		. 40 (T	- 4 40 0	\0\ <b>1</b> 0 1		10		.73		(
	A > 13.9 A £ 13.9		+ 1./6 x	[1 - exp	(-0.0003	849 x (11	-A -13.9	)2)] + 0.0	)013 x (	IFA -13	.9)			
nual	averag	e hot wa						(25 x N)				0.09		(
		-	hot water person per			-	-	to achieve	a water us	se target o	of Total			
]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
l t wate			day for ea						Оер	001	1404	Dec		
)m=	109	105.04	101.07	97.11	93.15	89.18	89.18	93.15	97.11	101.07	105.04	109		
L								l	-	L Total = Su	ım(44) <sub>112</sub> =	=	1189.1	
ergy c	content of	hot water	used - cal	culated mo	onthly = 4.	190 x Vd,r	n x nm x C	Tm / 3600	kWh/mon	nth (see Ta	ables 1b, 1	c, 1d)		
)m=	161.64	141.38	145.89	127.19	122.04	105.31	97.59	111.98	113.32	132.06	144.16	156.54		
etant	ลกคดบร พ	ator hoatii	na at noint	of use (no	hot water	r storaga)	enter∩in	boxes (46		Total = Su	ım(45) <sub>112</sub> =	=	1559.09	
	24.25		21.88							10.01	24.62	22.40		
)m=   ater s	storage	21.21 loss:	21.88	19.08	18.31	15.8	14.64	16.8	17	19.81	21.62	23.48		
orage	e volum	e (litres)	includin	g any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0		
comn	nunity h	eating a	nd no ta	nk in dw	elling, e	nter 110	litres in	(47)						
			hot wate	er (this in	icludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (	(47)			
	storage				!	(1.14/1	. /-1							
			eclared l		or is kno	wn (kvvr	n/day):					0		
-			m Table					(10)				0		
			storage eclared o	-		or is not		(48) x (49)	=			0		
			factor fr	-								0		
omn	nunity h	eating s	ee secti	on 4.3										
		from Tal										0		
mpe	rature f	actor fro	m Table	2b								0		
•			storage	, kWh/ye	ear			(47) x (51)	x (52) x (	53) =		0		
		(54) in (5	•									0		
aters	storage	loss cal	culated f	or each	month			((56)m = (	55) × (41)ı	m				
)m=	0	0	0	0	0	0	0	0	0	0	0	0		
ylinde	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	
)m=	0	0	0	0	0	0	0	0	0	0	0	0		
mar	v circuit	loss (an	nual) fro	m Table	 e 3							0		
-		,	•			59)m = (	(58) ÷ 36	65 × (41)	m					
-						•	. ,	ng and a		r thermo	stat)			
_		0	0	0	0	0	0	0	0	0	0	0		

Combiles calculated for each month (CA)m. (CO) + 2CF + (AA)m	
Combi loss calculated for each month $(61)$ m = $(60) \div 365 \times (41)$ m $(61)$ m= $\begin{bmatrix} 50.96 & 46.03 & 50.96 & 47.89 & 47.47 & 43.98 & 45.45 & 47.47 & 47.89 & 50.96 & 49.32 & 50.96 \end{bmatrix}$	(61)
Total heat required for water heating calculated for each month $(62)m = 0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$	
	(62)
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 0 0	(63)
Output from water heater	
(64)m= 212.6 187.4 196.85 175.08 169.51 149.29 143.03 159.45 161.21 183.02 193.47 207.5	
Output from water heater (annual) <sub>112</sub> 2138.41	(64)
Heat gains from water heating, kWh/month 0.25 $(0.85 \times (45))$ m + $(61)$ m] + 0.8 $\times (46)$ m + $(57)$ m + $(59)$ m	
(65)m= 66.49 58.51 61.25 54.26 52.44 46.01 43.81 49.1 49.65 56.65 60.26 64.79	(65)
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= 136.61 136.61 136.61 136.61 136.61 136.61 136.61 136.61 136.61 136.61 136.61 136.61 136.61	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	
(67)m= 23.57 20.93 17.02 12.89 9.63 8.13 8.79 11.42 15.33 19.47 22.72 24.22	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	
(68)m= 255.07 257.72 251.05 236.85 218.93 202.08 190.83 188.18 194.85 209.05 226.97 243.82	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	
(69)m= 36.66 36.66 36.66 36.66 36.66 36.66 36.66 36.66 36.66 36.66 36.66 (69)m=	(69)
Pumps and fans gains (Table 5a)	
(70)m= 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	(70)
Losses e.g. evaporation (negative values) (Table 5)	
(71)m= -109.29	(71)
Water heating gains (Table 5)	
(72)m= 89.36 87.07 82.32 75.36 70.49 63.9 58.88 65.99 68.96 76.14 83.7 87.08	(72)
Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$	
(73)m= 434.99 432.71 417.38 392.09 366.03 341.1 325.48 332.58 346.13 371.64 400.38 422.11	(73)
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 Area Flux g_ FF Gains	
Table 6d m² Table 6a Table 6b Table 6c (W)	
North 0.9x 0.77 x 14.76 x 10.63 x 0.35 x 0.8 = 30.45	(74)
	(74)
North 0.9x 0.77 x 14.76 x 34.53 x 0.35 x 0.8 = 98.88 (7)	(74)
North 0.9x 0.77 x 14.76 x 55.46 x 0.35 x 0.8 = 158.83 (7)	(74)
North 0.9x 0.77 x 14.76 x 74.72 x 0.35 x 0.8 = 213.96 (7	(74)

rtocano arra	mpato mno	Titloa by	4010101	001 000	rar a	1011. 1	ary acvi	iditioi	, , , , , , , , , , , , , , , , , , , ,	o outp	<i>310 01111010111</i>	. 10001101		
North 0.9	0.77	X	14.	76	X	7	79.99	x	0.35	x	0.8	=	229.05	(74)
North 0.9	0.77	X	14.	76	X	7	74.68	x	0.35	x	0.8	=	213.85	(74)
North 0.9	0.77	X	14.	76	X	5	9.25	x	0.35	x	0.8	=	169.66	(74)
North 0.9	0.77	X	14.	76	X		11.52	x	0.35	x	0.8	=	118.89	(74)
North 0.9	0.77	X	14.	76	X	2	24.19	x	0.35	x	0.8	=	69.27	(74)
North 0.9	0.77	X	14.	76	X	1	3.12	x	0.35	x	0.8	=	37.56	(74)
North 0.9	0.77	X	14.	76	X		8.86	x	0.35	x	0.8	=	25.38	(74)
Northwest 0.9	0.77	X	1.6	67	X	1	1.28	x	0.35	x	0.8	=	3.65	(81)
Northwest 0.9	0.77	X	1.6	67	X	2	22.97	X	0.35	х	0.8	=	7.43	(81)
Northwest 0.9	0.77	X	1.6	67	X		11.38	x	0.35	x	0.8	=	13.38	(81)
Northwest 0.9	0.77	X	1.6	67	X	6	67.96	X	0.35	х	0.8	=	21.98	(81)
Northwest 0.9	0.77	X	1.6	67	X	9	91.35	X	0.35	х	0.8	=	29.55	(81)
Northwest 0.9	0.77	X	1.6	67	X	9	7.38	X	0.35	х	0.8	=	31.5	(81)
Northwest 0.9	0.77	X	1.6	67	X		91.1	x	0.35	х	0.8	=	29.47	(81)
Northwest 0.9	0.77	X	1.6	67	X	7	72.63	X	0.35	x	0.8	=	23.49	(81)
Northwest 0.9	0.77	X	1.6	67	X	5	50.42	x	0.35	x	0.8	=	16.31	(81)
Northwest 0.9	0.77	X	1.6	67	X	2	28.07	X	0.35	х	0.8	=	9.08	(81)
Northwest 0.9	0.77	X	1.6	67	X		14.2	x	0.35	x	0.8	=	4.59	(81)
Northwest 0.9	0.77	X	1.6	67	X		9.21	x	0.35	х	0.8	=	2.98	(81)
Solar gains i (83)m= 34.1 Total gains -	65.62	112.27	180.81	243.51	2	60.55 83)m	243.31 , watts	(83)m 193	n = Sum(74)m .15 135.2	78.35	42.16	28.37		(83)
(84)m= 469.0	9 498.33	529.65	572.9	609.54	6	01.65	568.8	525	.73 481.32	449.9	9 442.53	450.48		(84)
7. Mean into	ernal temp	erature	(heating	seaso	n)									
Temperatur			`			area	from Tal	ole 9	, Th1 (°C)				21	(85)
Utilisation fa	actor for ga	ains for I	iving are	ea, h1,n	n (s	ee Ta	ıble 9a)		, ,					
Jan	Feb	Mar	Apr	May	Ť	Jun	Jul	А	ug Sep	Oct	Nov	Dec		
(86)m= 1	1	1	0.98	0.89	1	0.68	0.5	0.5	0.86	0.99	1	1		(86)
Mean interr	al tempera	ature in l	iving ar	ea T1 (1	follo	w ste	ps 3 to 7	7 in T	able 9c)		-		•	
(87)m= 20.31	<del></del>	20.53	20.75	20.93	_	20.99	21	2		20.75	20.5	20.3		(87)
Temperatur	e durina h	eating n	eriods ir	rest o	f dw	/ellino	from Ta	hle (	Th2 (°C)		<u>'</u>		ı	
(88)m= 20.35		20.36	20.37	20.37		20.38	20.38	20.	<del></del>	20.37	20.37	20.36		(88)
Utilisation fa	eter for a	nine for r	oct of d	wolling	h2	m (ca	no Tablo	.02/			_!	ļ.	l	
(89)m= 1	1 1	0.99	0.97	0.86	$\overline{}$	0.62	0.43	0.4	9 0.81	0.98	1	1		(89)
				ļ					<u>Į</u>	<u> </u>	1 .	<u> </u>		, ,
Mean interr (90)m= 19.41		19.73	20.06	of dwel 20.29	Ť	12 († 20.38	20.38	20.	i	le 9c) 20.06	19.69	19.4	]	(90)
(30)111= 19.41	19.52	18.13	20.00	20.29		.0.30	20.38	20.	<u> </u>		/ing area ÷ (		0.44	(90)
										, . — டா	g aroa - (•	., –	0.41	(31)
Mean interr				<del> </del>	$\overline{}$			_	T T		-		1	(e = )
(92)m= 19.77		20.06	20.34	20.55		20.63	20.63	20.		20.34		19.76		(92)
Apply adjus	tment to th	ne mean	ınterna	ı tempe	ratu	ire fro	m Table	4e,	where appr	opriate	!			

	19.62	19.72	19.91	20.19	20.4	20.48	20.48	20.48	20.44	20.19	19.87	19.61		(9:
B. Spac	ce heat	ing requ	uirement											
						ed at ste	ep 11 of	Table 9	b, so tha	t Ti,m=(	76)m an	d re-calc	ulate	
he utili T			or gains u					Π.						
L	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
			ains, hm				1	1		1				
4)m=	1	1	0.99	0.97	0.86	0.63	0.44	0.5	0.81	0.98	1	1		(9
	<del>-</del> -	hmGm ,	W = (94)	<u> </u>	4)m		•			•				
5)m= 4	468.56	497.26	526.29	555.28	525.22	378.54	252.28	264.04	391.75	441.07	441.31	450.1		(9
onthl	y avera	ge exte	rnal tem	perature	from Ta	able 8								
s)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		(
leat lo	ss rate	for mea	an intern	al tempe	erature, I	_m , W =	=[(39)m :	x [(93)m	– (96)m	]				
')m= 1	1044.62	1006.79	907.61	750.39	576.34	382.19	252.48	264.54	415.61	635.13	852.04	1035.88		(
pace	heating	require	ement fo	r each m	nonth, kV	Vh/mont	th = 0.02	24 x [(97	)m – (95	)m] x (4	1)m			
s)m= 4	428.58	342.41	283.7	140.48	38.04	0	0	0	0	144.39	295.72	435.82		
	!							Tota	l per year	(kWh/yeai	r) = Sum(9	8) <sub>15.912</sub> =	2109.13	
	h 4'			1-10/1- / 2	26						,	′ '''   		= '
pace	neating	require	ement in	KVVN/m²	year							l	21.26	(
. Ene	rgy requ	uiremer	nts – Indi	vidual h	eating sy	/stems i	ncluding	micro-C	CHP)					
pace	heatin	g:												
•		_	at from se	econdar	y/supple	mentary	system						0	(
ro ot!	n of sna	ace hea	at from m	ain syst	em(s)			(202) = 1	- (201) =			İ	1	= (
LACTIO					O(O)			,					•	
	•			•	, ,			(204) - (2	02) ~ [1	(202)] _		ŀ		$\dashv$
ractio	n of tota	al heatii	ng from ı	main sys	stem 1			(204) = (2	02) <b>×</b> [1 –	(203)] =			1	╡`
ractio	n of tota	al heatii		main sys	stem 1			(204) = (2	02) × [1 –	(203)] =			90.3	╡`
ractio	on of tota	al heatii nain spa	ng from ı	main sys	stem 1 em 1	g system		(204) = (2	02) <b>x</b> [1 –	(203)] =				
ractio	n of tota ncy of m	al heatii nain spa econda	ng from i	main sys	stem 1 em 1 y heating		າ, %				Nov	Dec	90.3	
raction fficient fficien	n of tota ncy of m ncy of s Jan	al heatii nain spa econda Feb	ng from i ace heati ry/supple Mar	main sys ing syste ementar Apr	stem 1 em 1 y heating May	Jun		(204) = (2 Aug	02) × [1 –	(203)] =	Nov	Dec	90.3	
raction fficien fficien	n of total ncy of m ncy of sa Jan heating	al heatin nain spa econda Feb g require	ng from i ace heati ry/supple Mar ement (c	main systemain systementary  Apr  alculate	em 1  y heating  May  d above)	Jun	n, % Jul	Aug		Oct			90.3	
fraction fficient fficient space	n of total ncy of mancy of so Jan heating	al heatin nain spa econda Feb require 342.41	ng from race heating ry/supplement (compared 283.7	main systementary Apr Alculated	stem 1 em 1 y heating May d above) 38.04	Jun	າ, %			Oct		Dec 435.82	90.3	ar
fraction fficient fficient space frace	n of total ncy of manager of some Jan heating 428.58 = {[(98)	al heatin nain spa econda Feb g require 342.41 m x (20	ng from race heating ry/supplement (compared 283.7	main system system alculated 140.48 00 ÷ (20	stem 1 em 1 y heating May d above) 38.04	Jun 0	n, % Jul 0	Aug 0	Sep 0	Oct 144.39	295.72	435.82	90.3	ar
raction fficien fficien pace pace	n of total ncy of mancy of so Jan heating	al heatin nain spa econda Feb require 342.41	ng from race heating ry/supplement (compared 283.7	main systementary Apr Alculated	stem 1 em 1 y heating May d above) 38.04	Jun	n, % Jul	Aug 0	Sep 0	Oct 144.39	295.72 327.49	435.82	90.3 0 kWh/ye	ar (
raction fficien fficien pace pace	n of total ncy of manager of some Jan heating 428.58 = {[(98)	al heatin nain spa econda Feb g require 342.41 m x (20	ng from race heating ry/supplement (compared 283.7	main system system alculated 140.48 00 ÷ (20	stem 1 em 1 y heating May d above) 38.04	Jun 0	n, % Jul 0	Aug 0	Sep 0	Oct 144.39	295.72	435.82	90.3	ar (
fraction fflicien fflicien space frace	on of total ncy of manager of set of the set	al heatin nain spa econda Feb g require 342.41 m x (20 379.19	ng from race heating ry/supplement (compared 283.7	Apr alculated 140.48 00 ÷ (20	stem 1 em 1 y heating May d above) 38.04 06) 42.12	Jun 0	n, % Jul 0	Aug 0	Sep 0	Oct 144.39	295.72 327.49	435.82	90.3 0 kWh/ye	ear
fraction fflicien fflicien space 111)m =	n of total heating 428.58 [ [(98)] 474.62	al heating nain spaneconda Feb grequire 342.41 m x (20 379.19	ng from race heating ry/supplement (compared 283.7 day)] } x 1	main systementary Apr alculated 140.48 00 ÷ (20 155.57	stem 1 em 1 y heating May d above) 38.04 06) 42.12	Jun 0	n, % Jul 0	Aug 0	Sep 0	Oct 144.39	295.72 327.49	435.82	90.3 0 kWh/ye	ar (
fraction fficient fficient fpace (11)m =	n of total heating 428.58 [ [(98)] 474.62	al heating nain spaneconda Feb grequire 342.41 m x (20 379.19	mg from race heating ry/supplement (company 283.7 mg) } x 1 mg 314.18	main systementary Apr alculated 140.48 00 ÷ (20 155.57	stem 1 em 1 y heating May d above) 38.04 06) 42.12	Jun 0	n, % Jul 0	Aug 0	Sep 0	Oct 144.39	295.72 327.49	435.82	90.3 0 kWh/ye	ar (2
fficien fficien fficien fpace final	n of total new of second property of second propert	al heatin nain spa econda Feb g require 342.41 m x (20 379.19 g fuel (si	ng from race heating ry/supplement (content 283.7 left) } x 1 left 314.18 left condary 00 ÷ (20 left condary 120 left 20 left condary 120 left 20 left	Apr alculated 140.48 00 ÷ (20 155.57	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month	Jun 0	o 0	Aug  0  Tota	Sep  0  0  I (kWh/yea	144.39  159.9  ar) =Sum(2	295.72 327.49 211) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	() () () () ()
Efficien Eff	n of total properties of the p	al heatin nain spa econda Feb g require 342.41 m x (20 379.19 g fuel (si	ng from race heating ry/supplement (content 283.7 left) } x 1 left 314.18 left condary 00 ÷ (20 left condary 120 left 20 left condary 120 left 20 left	Apr alculated 140.48 00 ÷ (20 155.57	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month	Jun 0	o 0	Aug  0  Tota	Sep  0  0  I (kWh/yea	144.39  159.9  ar) =Sum(2	295.72 327.49 211) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	() () () () ()
fraction fflicien fflicien space (11)m = space ([(98)n 5)m=	n of total heating 428.58 heating m x (200 neating	al heating nain spaneconda Feb grequire 342.41 m x (20 379.19 g fuel (single) } x 1 0	ng from race heating ry/supplement (company 283.7 and 314.18 are condary 00 ÷ (20 are condary 00 or	main systementary Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month	Jun 0	o 0	Aug  0  Tota	Sep  0  0  I (kWh/yea	144.39  159.9  ar) =Sum(2	295.72 327.49 211) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	() () () () ()
fraction of the fraction of th	heating n x (20)	al heatin nain spa econda Feb grequire 342.41 m x (20 379.19 g fuel (si 1)] } x 1 0	mg from race heating ry/supplement (color)  283.7  [4)] } x 1  314.18  econdary  00 ÷ (20)  0	Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month 0	Jun 0 0	o 0	Aug  0  Tota  0  Tota	Sep  0  0  1 (kWh/yea	Oct  144.39  159.9  ar) =Sum(2	295.72 327.49 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	(;; (;; (;; (;; (;;
fraction  fficien  fficien  fpace  figure  fig	heating n x (20) neating from wa 212.6	al heatin nain spa econda Feb grequire 342.41 m x (20 379.19 g fuel (s 1)] } x 1 0	mg from reace heating ry/supplement (company) 1 x 1 314.18 econdary 100 ÷ (20 0 ter (calculate) 196.85	main systementary Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month	Jun 0	o 0	Aug  0  Tota	Sep  0  0  I (kWh/yea	144.39  159.9  ar) =Sum(2	295.72 327.49 211) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	(3) (3) (3) (4) (4) (4) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6
fraction of ficience of ficien	heating m x (20) heating	reduire 342.41 m x (20 379.19 g fuel (set) 1)] } x 1 0	mg from race heating ry/supplement (content of the content of the	Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0	May dabove) 38.04  66) 42.12  month 0	Jun 0 0 0 149.29	0 0 143.03	Aug  0  Tota  159.45	Sep  0  0  1 (kWh/yea	Oct  144.39  159.9  ar) =Sum(2  0  183.02	295.72 327.49 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	(;; (;; (;; (;; (;; (;; (;; (;; (;; (;;
space [[(98)n=  ater h utput f  ficience  7)m=	n of total new of serious of seri	al heatin nain spa econda Feb grequire 342.41 m x (20 379.19 g fuel (sr 1)] } x 1 0	mg from reace heating ry/supplement (content of the content of the	main systementary Apr alculated 140.48 00 ÷ (200 155.57  y), kWh/8) 0  ulated al 175.08	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month 0	Jun 0 0	o 0	Aug  0  Tota  0  Tota	Sep  0  0  1 (kWh/yea	Oct  144.39  159.9  ar) =Sum(2	295.72 327.49 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	(;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
Efficient Efficient Efficient Efficient Efficient Efficient Efficient Efficience Efficie	n of total heating 428.58 heating m x (200 neating 1212.6 cy of water h	al heatin spareconda Feb grequire 342.41 m x (20 379.19 gfuel (sc 1)] } x 1 0  atter hea 187.4 atter hea 86.78 heating,	mg from reace heating ry/supplement (company 1) } x 1 314.18 econdary 00 ÷ (20 0) ter (calculater (calculater 86.24 kWh/mc	main systementary Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/8) 0  ulated al 175.08  84.89 onth	May dabove) 38.04  66) 42.12  month 0	Jun 0 0 0 149.29	0 0 143.03	Aug  0  Tota  159.45	Sep  0  0  1 (kWh/yea	Oct  144.39  159.9  ar) =Sum(2  0  183.02	295.72 327.49 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	(;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
fraction of ficient of ficience of ficine of ficience of ficience of ficience of ficience of ficience	n of total properties of the street of the s	reduired states the atter hear 187.4 atter hear 186.78 meating, m x 100	mg from reace heating ry/supplement (company 19 minus) } x 1	Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0  ulated al 175.08  84.89  onth m	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month 0 bove) 169.51	Jun 0 0 0 149.29 81	0 0 143.03 81	0 0 Tota 159.45 81	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Oct  144.39  159.9  ar) =Sum(2  183.02  84.85	295.72  327.49  211) <sub>15,1012</sub> 0  215) <sub>15,1012</sub> 193.47	435.82 482.63 0 207.5 87.08	90.3 0 kWh/ye	(;; (;; (;; (;; (;; (;; (;; (;; (;; (;;
fraction of ficient of ficience of ficine of ficience of ficience of ficience of ficience of ficience	n of total heating 428.58 heating m x (200 neating 1212.6 cy of water h	al heatin spareconda Feb grequire 342.41 m x (20 379.19 gfuel (sc 1)] } x 1 0  atter hea 187.4 atter hea 86.78 heating,	mg from reace heating ry/supplement (company 1) } x 1 314.18 econdary 00 ÷ (20 0) ter (calculater (calculater 86.24 kWh/mc	main systementary Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/8) 0  ulated al 175.08  84.89 onth	May dabove) 38.04  66) 42.12  month 0	Jun 0 0 0 149.29	0 0 143.03	0 0 Tota 159.45 81 196.85	0 0 0 1 (kWh/yea 161.21 81 199.02	Oct  144.39  159.9  ar) = Sum(2  0  183.02  84.85	295.72 327.49 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	435.82	90.3 0 kWh/ye	(2) (2) (2) (2) (2) (3) (4) (4) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6
Efficien  Effici	n of total properties of the street of the s	reduired states the atter hear 187.4 atter hear 186.78 meating, m x 100	mg from reace heating ry/supplement (company 19 minus) } x 1	Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0  ulated al 175.08  84.89  onth m	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month 0 bove) 169.51	Jun 0 0 0 149.29 81	0 0 143.03 81	0 0 Tota 159.45 81 196.85	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Oct  144.39  159.9  ar) = Sum(2  0  183.02  84.85	295.72  327.49  211) <sub>15,1012</sub> 0  215) <sub>15,1012</sub> 193.47	435.82 482.63 0 207.5 87.08	90.3 0 kWh/ye	(2 (2 (2 (2 (2 (2
Efficient Effici	n of total properties of the street of the s	reduired states the atter hear 187.4 atter hear 186.78 meating, m x 100	mg from reace heating ry/supplement (company 19 minus) } x 1	Apr alculated 140.48 00 ÷ (20 155.57  y), kWh/ 8) 0  ulated al 175.08  84.89  onth m	stem 1 em 1 y heating May d above) 38.04 06) 42.12 month 0 bove) 169.51	Jun 0 0 0 149.29 81	0 0 143.03 81	0 0 Tota 159.45 81 196.85	0 0 0 1 (kWh/yea 161.21 81 199.02	Oct  144.39  159.9  ar) = Sum(2  183.02  84.85  215.69  19a) <sub>112</sub> =	295.72  327.49  211) <sub>15,1012</sub> 0  215) <sub>15,1012</sub> 193.47	435.82 482.63 = 0 = 207.5 87.08	90.3 0 kWh/ye	(3) (3) (3) (4) (4) (4) (5) (5) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

recente and inpute informed by developer decidia	don. They dovideron to o	ortani to oatpat anioroi	ne roodino.		
Water heating fuel used				2534.9	
Electricity for pumps, fans and electric keep-hot					
mechanical ventilation - balanced, extract or pos	itive input from outside		242.15		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum o	of (230a)(230g) =		272.15	(231)
Electricity for lighting				416.24	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =	=		5558.98	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	<b>Emission fac</b> kg CO2/kWh		Emissions kg CO2/yea	
Space heating (main system 1)	0,				
Space heating (main system 1) Space heating (secondary)	kWh/year	kg CO2/kWh		kg CO2/yea	ar
	kWh/year	kg CO2/kWh	=	kg CO2/yea	ar ](261)
Space heating (secondary)	kWh/year (211) x (215) x	0.216 0.519 0.216	=	kg CO2/yea	(261) (263)
Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	0.216 0.519 0.216	=	kg CO2/yea 504.51 0 547.54	(261) (263) (264)
Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (2	kg CO2/kWh  0.216  0.519  0.216	= = =	kg CO2/yea 504.51 0 547.54 1052.05	(261) (263) (264) (265)
Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (263) + (2631) x	kg CO2/kWh  0.216  0.519  0.216  0.519	= = =	kg CO2/yea 504.51 0 547.54 1052.05	(261) (263) (264) (265) (267)

El rating (section 14)

(274)

# **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.16 Printed on 03 August 2022 at 12:20:04

Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 62.73m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: 205 BP Finchley Rd

Address: 205 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.27 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 14.30 kg/m<sup>2</sup> **OK** 

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 39.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 30.9 kWh/m²

OK

2 Fabric U-values

 Element
 Average
 Highest

 External wall
 0.15 (max. 0.30)
 0.15 (max. 0.70)
 OK

 Party wall
 0.00 (max. 0.20)
 OK

 Floor
 (no floor)
 OK

Roof (no roof)

Openings 0.96 (max. 2.00) 1.20 (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 3.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

6 Controls			
Space heating controls  Hot water controls:	TTZC by plumbing and e No cylinder thermostat	ectrical services	ок
Boiler interlock:	No cylinder Yes		ОК
7 Low energy lights			
Percentage of fixed lights with	th low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames va	alley):	Medium	OK
Based on:	• /		
Overshading:		Average or unknown	
Windows facing: North		7.61m²	
Windows facing: North West		1.67m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
10 Key features			
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m²K	
Party Walls U-value		0 W/m²K	

# Regulations Compliance Report

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.16 Printed on 03 August 2022 at 12:20:05

Project Information:

Assessed By: Robyn Berry (STRO036659) **Building Type:** Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE** Total Floor Area: 49.6m<sup>2</sup>

**Plot Reference:** Site Reference: **BP Finchley Road** 103 BP Finchley Rd

103 BP Finchley Rd, London, NW3 5EY 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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.21 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 14.88 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 34.9 kWh/m<sup>2</sup>

Dwelling Fabric Energy Efficiency (DFEE) 29.2 kWh/m<sup>2</sup>

OK

2 Fabric U-values

**Element Average Highest** External wall 0.14 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) **OK** 

Floor (no floor) Roof (no roof)

**Openings** 0.95 (max. 2.00) OK 1.20 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals 3.00 (design value)

Maximum **OK** 10.0

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

6 Controls			
Space heating controls  Hot water controls:	TTZC by plumbing and e No cylinder thermostat No cylinder	electrical services	ОК
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights wit Minimum	n low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames va	lley):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: South West		6.65m²	
Windows facing: South East		3.04m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
10 Key features			
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m <sup>2</sup> K	
Party Walls U-value		0 W/m²K	

		User D	etails:						
Assessor Name:	Robyn Berry	;	Stroma	a Num	ber:		STRO	036659	
Software Name:	Stroma FSAP 2012	;	Softwa	re Ve	rsion:		Versio	n: 1.0.5.16	
	F	Property A	Address:	205 BF	Pinchle	y Rd			
Address :	205 BP Finchley Rd, Londo	n, NW3 5	5EY						
1. Overall dwelling dime	nsions:								
		Area	· ·		Av. He	ight(m)	, ,	Volume(m³)	_
Ground floor		62	2.73	(1a) x	2	.54	(2a) =	159.34	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 62	2.73	(4)					
Dwelling volume				(3a)+(3b	)+(3c)+(3c	d)+(3e)+	.(3n) =	159.34	(5)
2. Ventilation rate:									
	main seconda heating heating	ry (	other		total			m³ per hou	r
Number of chimneys		<b>]</b> + [	0	= [	0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	_ + _	0	] = [	0	x	20 =	0	(6b)
Number of intermittent fa	ns			Ī	0	<b>x</b> '	10 =	0	(7a)
Number of passive vents	i.			Ī	0	x -	10 =	0	(7b)
Number of flueless gas fi	res			Ī	0	X	40 =	0	(7c)
				_					_
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+(7a)$	7a)+(7b)+(7	7c) =		0		÷ (5) =	0	(8)
	peen carried out or is intended, procee	ed to (17), o	therwise o	ontinue fr	rom (9) to	(16)			_
Number of storeys in the	ne dwelling (ns)							0	(9)
Additional infiltration	OF for all of the books of a second	. 0.05 (				[(9)	-1]x0.1 =	0	(10)
	.25 for steel or timber frame or resent, use the value corresponding to			•	uction			0	(11)
deducting areas of opening		o ine greate	a wall alte	a (anter					
If suspended wooden f	floor, enter 0.2 (unsealed) or 0	.1 (seale	d), else	enter 0				0	(12)
If no draught lobby, en	ter 0.05, else enter 0							0	(13)
Percentage of windows	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 metre	•	•	•	etre of e	envelope	area	3	(17)
If based on air permeabil	ity value, then $(18) = [(17) \div 20] + (18)$	8), otherwis	se (18) = (	16)				0.15	(18)
	es if a pressurisation test has been do	ne or a deg	ree air pei	meability	is being u	sed	ı		_
Number of sides sheltere Shelter factor	:d		(20) = 1 - [	0 075 v (1	19)1 –			3	(19)
	ting aboltor footor		(20) = 1 = [ (21) = (18)					0.78	(20)
Infiltration rate incorporat	•	,	(21) = (10)	X (20) =				0.12	(21)
Infiltration rate modified f	<del></del>	, ,		<u> </u>	<u> </u>		5.	1	
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	1 1	<del>                                     </del>			T .	T .		1	
(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 ÷ 4								
	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
					<u> </u>		L	I	

Adjusted infiltration rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
0.15 0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14		
Calculate effective air	•	rate for t	he appli	cable ca	se	!	!	!	!	1	1	
If mechanical ventila											0.5	(23a)
If exhaust air heat pump								) = (23a)			0.5	(23b)
If balanced with heat reco	-	•	_								76.5	(23c)
a) If balanced mech					<del>- ` ` </del>	<del>- ^ ` </del>	ŕ	<del> </del>	<del></del>	<del>- ` ` ` ` `</del>	÷ 100] ı	(5.4.)
(24a)m= 0.27 0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		(24a)
b) If balanced mech					<del></del>	<del> </del>	<del>í `</del>	<del>r ´       `</del>	<del>-                                    </del>		1	(5.41.)
(24b)m = 0 0	0	0	0	0	0	0	0	0	0	0		(24b)
c) If whole house ex if (22b)m < 0.5 >			-	•				.5 × (23b	o)	_		
(24c)m = 0 0	0	0	0	0	0	0	0	0	0	0		(24c)
d) If natural ventilation if (22b)m = 1, the			•					0.5]				
(24d)m= 0 0	0	0	0	0	0	0	0	0	0	0		(24d)
Effective air change	rate - er	iter (24a	or (24b	o) or (24	c) or (24	d) in box	(25)	-	-	-		
(25)m= 0.27 0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		(25)
3. Heat losses and he	at loss r	naramete	٦r.									
<b>ELEMENT</b> Gros	SS	Openin m	gs	Net Ar A ,r		U-valı W/m2		A X U (W/		k-value kJ/m²-l		X k J/K
Doors	(*** )			2.1	x	1.2		2.52				(26)
Windows Type 1				7.613	=	/[1/( 0.9 )+	!	6.61	=			(27)
Windows Type 2				1.667		/[1/( 0.9 )+	l.	1.45	$\exists$			(27)
Walls Type1 34.5		9.28	$\neg$	25.3	=	0.15		3.8	╡ ,			(29)
Walls Type2 21.4		2.1	=		_		=		<del> </del>		$\exists$	(29)
Total area of elements		2.1		19.38	=	0.14	= [	2.74				
	, 111-			56.06	=			_				(31)
Party wall				37.5	=	0	=	0			_	(32)
Party floor				62.73	<u> </u>				[		┥	(32a)
Party ceiling				62.73					[			(32b)
* for windows and roof wind ** include the areas on both					ated using	g formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	n 3.2	
Fabric heat loss, W/K						(26)(30)	) + (32) =				17.12	(33)
Heat capacity Cm = S(	•	,					((28)	(30) + (32	2) + (32a).	(32e) =	8759.51	(34)
Thermal mass parame		o = Cm ÷	- TFA) in	kJ/m²K			Indica	tive Value	: Medium		250	(35)
For design assessments wh	ere the de	tails of the	,			ecisely the	e indicative	e values of	TMP in T	able 1f		``
Thermal bridges : S (L	x Y) cal	culated ı	using Ap	pendix ł	<						5.62	(36)
if details of thermal bridging	are not kn	own (36) =	= 0.05 x (3	1)								
Total fabric heat loss							(33) +	(36) =			22.74	(37)
Ventilation heat loss ca		monthly	/			•		= 0.33 × (	(25)m x (5)	)	1	
Jan Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 13.97 13.82	13.67	12.9	12.75	11.99	11.99	11.83	12.29	12.75	13.06	13.36		(38)
Heat transfer coefficier	nt, W/K						(39)m	= (37) + (	38)m		<u>-</u>	
(39)m= 36.72 36.56	36.41	35.65	35.49	34.73	34.73	34.58	35.03	35.49	35.8	36.1		
Stroma FSAP 2012 Version	1.0.5.16 (	SAP 9.92)	- http://wv	vw.stroma	.com			Average =	Sum(39) <sub>1</sub>	12 /12=	35.6≱ <sub>age</sub>	2 0 (39)

at loss	parar	meter (F	ILP), W/	m²K					(40)m	$= (39)m \div$	(4)			
)m= 0	.59	0.58	0.58	0.57	0.57	0.55	0.55	0.55	0.56	0.57	0.57	0.58		
ımher o	of days	s in mor	nth (Tabl	le 1a)						Average =	Sum(40) <sub>1</sub> .	12 /12=	0.57	(
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
-	31	28	31	30	31	30	31	31	30	31	30	31		(
		!								Į.				
. Water	heati	ng ener	gy requi	rement:								kWh/ye	ear:	
sumed	occup	pancy, N	١								2.	06		(
			+ 1.76 x	[1 - exp	(-0.0003	849 x (TF	A -13.9	)2)] + 0.0	0013 x (	TFA -13.	9)			
f TFA £ nual av		•	iter usac	ae in litre	s per da	av Vd.av	erage =	(25 x N)	+ 36		83	.07		(
duce the	annual	average	hot water	usage by	5% if the a	lwelling is	designed t	o achieve		se target o		.07		•
_	-					not and co		1		ı	ı			
	Jan	Feb	Mar	Apr	May	Jun	Jul Table 1c x	Aug	Sep	Oct	Nov	Dec		
_	<del></del>	· · ·			-	1	1	<u> </u>				<u> </u>		
)m= 9°	1.38	88.06	84.73	81.41	78.09	74.76	74.76	78.09	81.41	84.73	88.06	91.38		_
ergy cont	ent of l	hot water	used - cal	culated mo	onthly = $4$ .	190 x Vd,r	n x nm x E	OTm / 3600			m(44) <sub>112</sub> = ables 1b, 1	L	996.85	'
	35.51	118.52	122.3	106.62	102.31	88.29	81.81	93.88	95	110.71	120.85	131.24		
				.00.02	.02.0	00.20	0	00.00			m(45) <sub>112</sub> =	<u> </u>	1307.03	
stantane	eous wa	ater heatir	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46			( /2	L		
)m= 20	0.33	17.78	18.35	15.99	15.35	13.24	12.27	14.08	14.25	16.61	18.13	19.69		
ater sto	-									l		<u> </u>		
orage v	olume	e (litres)	includin	g any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0		(
	-	_			-		litres in	' '		(O! : /	47\			
nerwise ater sto			not wate	er (triis ir	iciuaes i	nstantar	ieous co	mbi boil	ers) ente	er o in (	47)			
	-		clared le	oss facto	or is kno	wn (kWł	n/day):					0		(
			m Table			(	.,, , .					0		
•				, kWh/ye	ear			(48) x (49)	· =			0		,
			_	-		or is not		( - / ( - /				<u> </u>		•
		-			e 2 (kW	h/litre/da	ıy)					0		
	-	_	ee section	on 4.3										
		rom Tal	ole 2a m Table	2h							-	0		(
•									(=a) (	>		0		(
•••		m water 54) in (5	_	, kWh/ye	ear			(47) x (51)	x (52) x (	53) =	-	0		
•	, ,	, ,	•	or oach	month			((EG)m - (	EE) (41)	<b>~</b>		0		
_				or each		Γ		((56)m = (			Ι			
)m=	0	0	0	0	0 (50)	0	0	0	0 (50)	0	0	0		
/iinaer co	ontains	dedicated	solar sto	rage, (57)i	n = (56)m	X [(50) – (	H11)] ÷ (5	0), eise (5	/)m = (56)	m wnere (	H11) IS Tro	m Appendi	хн	
)m=	0	0	0	0	0	0	0	0	0	0	0	0		(
mary c	ircuit l	loss (an	nual) fro	m Table	3							0		
mary c	ircuit l	loss cal	culated f	or each	month (	59)m = (	(58) ÷ 36	65 × (41)	m					
modifie	ed by	factor fr	om Tabl	le H5 if t	here is s	solar wat	er heatii	ng and a	cylinde	r thermo	stat)			
modine	,													

Combi loss o	alculated	for eac	h month	(61)m =	(60) ÷ 3	65 × (41	)m					-	
(61)m= 46.57	40.53	43.18	40.15	39.79	36.87	38.1	39.7	9 40.15	43.18	43.42	46.57		(61)
Total heat re	quired for	water	neating c	alculated	for eac	h month	(62)r	n = 0.85 ×	(45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 182.0	8 159.05	165.48	146.77	142.1	125.15	119.91	133.	67 135.15	153.89	164.27	177.8		(62)
Solar DHW inpu	ıt calculated	using Ap	pendix G o	r Appendix	H (negat	ive quantity	y) (ente	er '0' if no sola	r contribu	tion to wate	er heating)		
(add addition	nal lines if	FGHR:	S and/or \	WWHRS	applies	, see Ap	pend	ix G)		-	-	-	
(63)m= 0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output from	water hea	ter								_		_	
(64)m= 182.0	8 159.05	165.48	146.77	142.1	125.15	119.91	133.	67 135.15	153.89	164.27	177.8		_
							(	Output from w	ater heate	er (annual) <sub>1</sub>	12	1805.32	(64)
Heat gains fr	om water	heating	g, kWh/m	onth 0.2	5 ´ [0.85	× (45)m	ı + (6	1)m] + 0.8	x [(46)m	+ (57)m	+ (59)m	1]	
(65)m= 56.7	49.54	51.46	45.49	43.97	38.57	36.73	41.1	6 41.62	47.61	51.04	55.28		(65)
include (57	7)m in cald	culation	of (65)m	only if c	ylinder	s in the	dwelli	ng or hot w	ater is f	rom com	munity h	neating	
5. Internal	gains (see	Table	5 and 5a	):									
Metabolic ga				,									
Jan	<u> </u>	Mar		May	Jun	Jul	Αι	ıg Sep	Oct	Nov	Dec	]	
(66)m= 102.8	9 102.89	102.89	<del> </del>	102.89	102.89	102.89	102.	<del></del>	102.89	102.89	102.89	1	(66)
Lighting gain	s (calcula	ted in A	Appendix	L. equat	ion L9 o	r L9a). a	ılso se	ee Table 5	·	1	<u> </u>	1	
(67)m= 16.99	<u> </u>	12.27	9.29	6.95	5.86	6.34	8.2		14.04	16.38	17.46	]	(67)
Appliances g	ains (calc	ulated	in Appen	dix L. ea	uation L	.13 or L1	3a). a	ulso see Ta	ble 5	1	<u> </u>	1	
(68)m= 179.7	<u> </u>	176.95	<del>- · · · -</del>	154.3	142.43	134.5	132.		147.34	159.97	171.85	]	(68)
Cooking gair		ted in	Annendix	I equat	tion I 15	or I 15a	) also	see Table	. 5	<u> </u>	<u> </u>	1	
(69)m= 33.29	<del></del>	33.29	33.29	33.29	33.29	33.29	33.2		33.29	33.29	33.29	1	(69)
Pumps and f		(Table		<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u> </u>			1	
(70)m= 3	3	3	3	3	3	3	3	3	3	3	3	1	(70)
Losses e.g. o				ļ								I	( - /
(71)m= -82.3	<del></del>	-82.31	-82.31	-82.31	-82.31	-82.31	-82.	31 -82.31	-82.31	-82.31	-82.31	1	(71)
` '				02.01	-02.01	02.01	02.	02.01	02.01	02.01	02.51	J	()
Water heatin	<del>``</del>	69.17	63.18	59.09	53.57	49.36	55.3	3 57.81	63.99	70.89	74.3	1	(72)
` '	_!	l	03.16	39.09		<u> </u>	I		l		<u> </u>	J	(12)
Total interna	<del>_</del>		T 000 00	T 077 04	<u> </u>	, , ,		)m + (69)m +	·	<del>,</del>		1	(72)
(73)m= 329.8		315.25	296.28	277.21	258.73	247.06	253.	06 263.06	282.23	304.11	320.48	]	(73)
6. Solar gains are		ucina co	ar flux from	Table 6a	and accor	siated equa	ations t	a convert to th	o applica	ble orientat	tion		
Orientation:		•	Area		Flu	•	1110113 1		іс аррііса	FF	iioii.	Gains	
Onemation.	Table 6d		m <sup>2</sup>			ble 6a		g_ Table 6b	Т	able 6c		(W)	
North 0.9	0.77		x 7.0	21	x -	10.63	] <sub>x</sub> [	0.35	$\neg x \vdash$	0.8		15.71	(74)
North 0.9		_					] ^ [ ] <sub>x</sub> [		^ L		╡ -		$\frac{1}{1}^{(74)}$
North 0.9		_				20.32	, L	0.35		0.8	=	30.02	] <sup>(74)</sup> ] <sub>(74)</sub>
						34.53	]	0.35		0.8	=	51.01	╡
		_	× 7.0			55.46	X [	0.35	X	8.0	=	81.93	[(74)
North 0.9	0.77		X 7.0	51	X	74.72	X	0.35	X	0.8	=	110.37	(74)

	,									,				
North 0.	9x 0.77	×	7.6	61	X	7	79.99	x	0.35	x	0.8	=	118.16	(74)
North 0.	9x 0.77	x	7.6	61	X	7	4.68	x	0.35	x	0.8		110.31	(74)
North 0.	9x 0.77	×	7.6	51	X	5	9.25	x	0.35	x	0.8		87.52	(74)
North 0.	9x 0.77	. x	7.6	51	X	4	1.52	x	0.35	x	0.8		61.33	(74)
North 0.	9x 0.77	×	7.6	51	X	2	24.19	х	0.35	x	0.8	=	35.73	(74)
North 0.	9x 0.77	×	7.6	51	X	1	3.12	х	0.35	x	0.8	=	19.38	(74)
North 0.	9x 0.77	×	7.6	51	X		8.86	x	0.35	x	0.8	<u> </u>	13.09	(74)
Northwest 0	9x 0.77	×	1.6	67	X	1	1.28	x	0.35	x	0.8		3.65	(81)
Northwest 0	9x 0.77	X	1.6	67	X	2	22.97	x	0.35	x	0.8	<b>=</b>	7.43	(81)
Northwest 0.	9x 0.77	. x	1.6	67	X	4	1.38	x	0.35	x	0.8		13.38	(81)
Northwest 0	9x 0.77	X	1.6	67	X	6	67.96	x	0.35	x	0.8		21.98	(81)
Northwest 0	9x 0.77	×	1.6	67	X	9	1.35	х	0.35	x	0.8	=	29.55	(81)
Northwest 0	9x 0.77	×	1.6	67	X	9	7.38	x	0.35	×	0.8		31.5	(81)
Northwest 0	9x 0.77	×	1.6	67	X	,	91.1	х	0.35	x	0.8	=	29.47	(81)
Northwest 0	9x 0.77	×	1.6	67	X	7	2.63	х	0.35	x	0.8	=	23.49	(81)
Northwest 0	9x 0.77	X	1.6	67	X	5	50.42	х	0.35	x	0.8	=	16.31	(81)
Northwest 0	9x 0.77	X	1.6	67	X	2	28.07	х	0.35	x	0.8		9.08	(81)
Northwest 0	9x 0.77	X	1.6	67	X		14.2	x	0.35	x	0.8		4.59	(81)
Northwest 0	9x 0.77	x	1.6	67	X	,	9.21	x	0.35	x	0.8	<del>-</del>	2.98	(81)
Solar gains (83)m= 19. Total gains	36 37.45	64.39	103.91	139.92	1	49.66 83)m	139.78 , watts	(83)m 111	n = Sum(74)m .01 77.64	(82)m 44.81	23.97	16.08	]	(83)
(84)m= 349	9.2 364.77	379.65	400.19	417.13	4	08.39	386.85	364	.07 340.7	327.0	4 328.08	336.55		(84)
7. Mean i	nternal tem	perature	(heating	seasor	า)									
Temperat	ure during l	neating p	eriods ir	the liv	ing	area	from Tal	ole 9	, Th1 (°C)				21	(85)
Utilisation	factor for g	ains for l	living are	ea, h1,n	n (s	ee Ta	ıble 9a)							
Já	an Feb	Mar	Apr	May		Jun	Jul	Α	ug Sep	Oct	Nov	Dec		
(86)m=	0.99	0.98	0.93	0.77		0.54	0.39	0.4	0.7	0.95	0.99	1		(86)
Mean inte	rnal tempe	rature in	living are	ea T1 (f	ollo	w ste	ps 3 to 7	7 in T	able 9c)	-	-			
(87)m= 20.	<u>-</u>	20.74	20.9	20.99		21	21	2	<del></del>	20.9	20.71	20.55	]	(87)
Temperat	ure during l	neating n	erinds ir	rest of	f dw	elling	from Ta	hle (	Th2 (°C)					
(88)m= 20.		20.45	20.46	20.46	_	20.47	20.47	20.	<del>`                                    </del>	20.46	20.46	20.45	]	(88)
	factor for a	raine for	roct of d	wolling	h2	m (cc	no Tablo	02) —	<u> </u>	<u> </u>	<u>!</u>		I	
(89)m= 1	factor for g	0.98	0.91	0.73	_	0.5	0.35	9a) 0.3	39 0.65	0.93	0.99	1	1	(89)
							ļ		<u> </u>	<u> </u>	0.00	'		()
		1	1	1	Ť	,	20.47	r <del>i</del>	to 7 in Tabl	,	20.00	19.84	1	(90)
(90)m= 19.	04 19.94	20.12	20.35	20.45		20.47	20.47	20.		20.35	20.08 ving area ÷ (4		0.05	<b>_</b> ``
										ier – en	mig aiea → (4	·, –	0.35	(91)
		•			$\overline{}$				– fLA) × T2		1		1	
(92)m= 20.		20.33	20.54	20.63		20.65	20.65	20.		20.54		20.08		(92)
Apply adia	ustment to t	the mean	interna	l tempe	ratu	ire fro	m Table	4e,	where appro	opriate				

Results and in	puts info	ormed by	develo <sub>l</sub>	per decla	aration. /	Any devi	iation is	certain to	o output	differen	t results.		
(93)m= 19.94	20.03	20.18	20.39	20.48	20.5	20.5	20.51	20.5	20.39	20.15	19.93	]	(93)
8. Space hea	ting requ	uirement											
Set Ti to the r					ed at ste	ep 11 of	Table 9l	o, so tha	t Ti,m=(	76)m an	d re-calc	culate	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	]	
Utilisation fac	tor for g			,				•				ı	
(94)m= 1	0.99	0.98	0.91	0.73	0.5	0.35	0.39	0.65	0.93	0.99	1	1	(94)
Useful gains,	hmGm	, W = (94	4)m x (8	4)m		<u> </u>						1	
(95)m= 347.57	361.72	371.21	364.77	306.03	204.89	135.61	141.97	222.56	303.1	324.07	335.34		(95)
Monthly avera	age exte	rnal tem	perature	from Ta	able 8		!			!	!	1	
(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	for me	an intern	al tempe	erature,	Lm , W =	=[(39)m	x [(93)m	– (96)m	]			1	
(97)m= 574.3	553.1	498.2	409.51	311.75	205.06	135.61	141.98	224.15	347.45	467.14	568.03		(97)
Space heatin	g require	ement fo	r each n	nonth, k\	/Vh/mont	th = 0.02	24 x [(97	)m – (95	)m] x (4	1)m		1	
(98)m= 168.69	128.61	94.48	32.21	4.26	0	0	0	0	33	103.01	173.12		
							Tota	l per year	(kWh/yea	r) = Sum(9	18) <sub>15,912</sub> =	737.39	(98)
Space heatin	a requir	ament in	k\/\h/ma	2/vear								11.75	(99)
·	• .											11.75	
9a. Energy red	•	nts – Indi	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space heatin	•	ot from o	ooondor	v/ou polo	montory	ovotom							(201)
Fraction of sp					mentary	•		(004)				0	╡ `
Fraction of sp	ace hea	at from m	nain syst	em(s)			(202) = 1	- (201) =				1	(202)
Fraction of to	tal heati	ng from i	main sys	stem 1			(204) = (2	02) × [1 –	(203)] =			1	(204)
Efficiency of r	main spa	ace heati	ing syste	em 1								90.3	(206)
Efficiency of s	seconda	ry/supple	ementar	y heating	g system	າ, %						0	(208)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	-d ear
Space heatin							<u> </u>	•	<u> </u>			1	
168.69	128.61	94.48	32.21	4.26	0	0	0	0	33	103.01	173.12	1	
(211)m = {[(98	)m x (20	14)1	00 ÷ (20	)6)		I						ı	(211)
186.81	142.42	104.63	35.67	4.72	0	0	0	0	36.55	114.08	191.72	1	(211)
										211) <sub>15,1012</sub>		816.6	(211)
Casas bastin	a fuel (e	0000000	\\/b.	manth					, ,	715,101	2	010.0	(,
Space heatin $= \{[(98)m \times (200)]\}$	•			month									
$= \chi (30) \text{III X } (20) \text{(215)m} = 0$	0	00 + (20	0	0	0	0	0	0	0	0	0	1	
(210)111-				Ŭ	Ŭ					215) <sub>15,1012</sub>		0	(215)
Water beating	_							. (	)	- · · · /15,1012	2		
Water heating		tor (colo	ulatad a	hovo)									
Output from w	159.05	165.48	146.77	142.1	125.15	119.91	133.67	135.15	153.89	164.27	177.8	1	
Efficiency of w					00		1 .00.0.			1 .0	1	81	(216)
(217)m= 85.22	84.91	84.15	82.53	81.24	81	81	81	81	82.5	84.35	85.34	- 01	(217)
` '				01.24	01	01	_ o1	01	02.0	04.33	00.04	J	(=11)
Fuel for water $(219)m = (64)$	•												
(219)m= $213.65$	187.31	196.65	177.84	174.91	154.51	148.03	165.02	166.85	186.53	194.76	208.35	1	
						<u> </u>	Tota	I = Sum(2:	19a) <sub>112</sub> =	ı	1	2174.43	(219)
Annual totals										Wh/yeaı	•	kWh/year	┛` ′
Space heating		ed, main	system	1						<i></i> , oai		816.6	٦
,		,											_

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Results and inputs informed by developer declara	ation. Any deviation is certa	iiri to output amerer	n resuns.		
Water heating fuel used				2174.43	
Electricity for pumps, fans and electric keep-hot					
mechanical ventilation - balanced, extract or pos	sitive input from outside		153.09		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum of (23	30a)(230g) =		183.09	(231)
Electricity for lighting				300.09	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =			3474.2	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	Emission fac kg CO2/kWh	ctor	Emissions kg CO2/ye	
Space heating (main system 1)			ctor =		
Space heating (main system 1) Space heating (secondary)	kWh/year	kg CO2/kWh		kg CO2/ye	ar ¬
	kWh/year (211) x	kg CO2/kWh	=	kg CO2/ye	ar ](261)
Space heating (secondary)	kWh/year (211) x (215) x	kg CO2/kWh  0.216  0.519  0.216	=	kg CO2/ye	(261) (263)
Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	kg CO2/kWh  0.216  0.519  0.216	=	kg CO2/ye 176.39 0 469.68	(261) (263) (264)
Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264) =	kg CO2/kWh  0.216  0.519  0.216	= =	kg CO2/ye  176.39  0  469.68  646.06	(261) (263) (264) (265)
Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year  (211) x  (215) x  (219) x  (261) + (262) + (263) + (264) = (231) x  (232) x	kg CO2/kWh  0.216  0.519  0.216	= = =	kg CO2/ye  176.39  0  469.68  646.06  95.02	(261) (263) (264) (265) (267)

El rating (section 14)

(274)

		Harri D	a ta Ha						
		User D	etails:						
Assessor Name:	Robyn Berry		Stroma	a Num	ber:		STRO	036659	
Software Name:	Stroma FSAP 2012		Softwa	re Vei	rsion:		Versio	n: 1.0.5.16	
	F	Property A	Address:	306 BF	Pinchle	y Rd			
Address :	306 BP Finchley Rd, Londo	n, NW3 5	5EY						
1. Overall dwelling dime	nsions:								
		Area	a(m²)		Av. He	ight(m)	-	Volume(m³)	_
Ground floor		8	39.7	(1a) x	2	.54	(2a) =	227.83	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 8	39.7	(4)					
Dwelling volume				(3a)+(3b	)+(3c)+(3c	d)+(3e)+	.(3n) =	227.83	(5)
2. Ventilation rate:									
	main seconda heating heating	ry	other		total			m³ per houi	•
Number of chimneys		+	0	] = [	0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	7 + 🗀	0	=	0	x	20 =	0	(6b)
Number of intermittent fa	ns			Ī	0	x '	10 =	0	(7a)
Number of passive vents	i				0	x ′	10 =	0	(7b)
Number of flueless gas fi	res				0	X 4	40 =	0	(7c)
				_					
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+(6b)$	7a)+(7b)+(7	7c) =		0		÷ (5) =	0	(8)
	peen carried out or is intended, procee	ed to (17), c	otherwise o	ontinue fr	rom (9) to	(16)			_
Number of storeys in the Additional infiltration	ne dwelling (ns)					1(0)	41.04	0	(9)
	.25 for steel or timber frame o	r 0 25 for	macan	v oonatr	ruotion	[(9)	-1]x0.1 =	0	(10)
	.25 for steer or timber frame of resent, use the value corresponding to			•	uction			0	(11)
deducting areas of opening		o ino ground	or wan are	a (uno					
If suspended wooden f	floor, enter 0.2 (unsealed) or 0	).1 (seale	d), else	enter 0				0	(12)
If no draught lobby, en	ter 0.05, else enter 0							0	(13)
Percentage of windows	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 metre	•	•	•	etre of e	envelope	area	3	(17)
•	ity value, then $(18) = [(17) \div 20] + (18)$							0.15	(18)
	es if a pressurisation test has been do	ne or a deg	gree air pei	meability	is being u	sed			٦
Number of sides sheltere Shelter factor	ł <b>d</b>		(20) = 1 -	0 075 x (1	19)1 =			3	(19)
Infiltration rate incorporat	ting chalter factor		(21) = (18)					0.78	(20)
•	•		(21) - (10)	X (20) =				0.12	(21)
Infiltration rate modified f	<del></del>	1 11	۸۰۰۰	Con	Oct	Nov	Doo	]	
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	<del> </del>				T	1.5		1	
(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 = (22	2)m ÷ 4								
	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
								-	

Adjusted infiltr	ation rate	e (allowi	ng for sh	nelter an	nd wind s	speed) =	(21a) x	(22a)m				_	
0.15 Calculate effe	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14		
If mechanica		•	iale ioi l	пе аррп	cable ca	1SE						0.5	(23
If exhaust air he	eat pump u	sing Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (I	N5)) , othe	rwise (23b	) = (23a)			0.5	(23)
If balanced with	n heat recov	very: effic	iency in %	allowing f	for in-use f	actor (fron	n Table 4h	) =				76.5	(230
a) If balance	ed mecha	nical ve	entilation	with he	at recov	ery (MVI	HR) (24a	a)m = (22)	2b)m + (	23b) × [	1 – (23c)	÷ 100]	
(24a)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	]	(24
b) If balance	ed mecha	nical ve	entilation	without	heat red	covery (N	ЛV) (24b	o)m = (22	2b)m + (2	23b)		-	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h if (22b)n	ouse ext			•					.5 × (23b	o)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0	]	(24
d) If natural if (22b)n	ventilatio n = 1, the								0.5]				
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0	]	(24
Effective air	change r	rate - er	nter (24a	) or (24b	o) or (24	c) or (24	d) in box	x (25)				_	
(25)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		(25)
3. Heat losse	s and hea	at loss p	paramet	er:									
ELEMENT	Gross area (	_	Openin m	=	Net Ar A ,r		U-val W/m2		A X U (W/I	<b>〈</b> )	k-value kJ/m²-l		A X k kJ/K
Doors					2.1	X	1.2	= [	2.52				(26)
Windows Type	e 1				10.43	7 x1	/[1/( 0.9 )+	0.04] =	9.07				(27
Windows Type	2				1.532	<u>x</u> 1	/[1/( 0.9 )+	0.04] =	1.33				(27
Walls Type1	51.12	2	11.9	7	39.15	5 X	0.15		5.87			$\neg \vdash$	(29
Walls Type2	24.45	5	2.1		22.36	3 x	0.14	<u> </u>	3.16			$\neg$	(29
Roof	35.51	1	0		35.5	1 x	0.12	<u> </u>	4.26			$\neg$	(30
Total area of e	elements,	m²			111.0	9							(31
Party wall					36.9	1 x	0	=	0				(32
Party floor					89.7								(32
Party ceiling					54.18	3				Ī			(32
* for windows and ** include the area						lated using	formula 1	/[(1/U-valu	ıe)+0.04] a	ns given in	paragraph	1 3.2	
Fabric heat los	ss, W/K =	S (A x	U)				(26)(30)	) + (32) =				26.22	(33
Heat capacity	Cm = S(A)	Axk)						((28)	(30) + (32	2) + (32a).	(32e) =	10884.2	1 (34
Thermal mass	paramet	ter (TMF	P = Cm -	- TFA) ir	n kJ/m²K			Indica	tive Value	Medium		250	(35
For design assess can be used inste				construct	ion are no	t known pi	ecisely the	e indicative	e values of	TMP in Ta	able 1f		
Thermal bridge	•	,		• .	•	K						5.65	(36
f details of therma		are not kn	own (36) =	= 0.05 x (3	31)			(22) -	(26)				
Fotal fabric he		loulotos	l monthl	,				, ,	(36) =	25\m v (5)		31.86	(37
entilation hea	г г		· ·		lı	16.0	۸	<del>``</del>	= 0.33 × (	<u> </u>		1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	J	

38)m= 19.98	19.76	19.54	18.45	18.23	17.14	17.14	16.92	17.57	18.23	18.67	19.1		(38)
Heat transfer	coefficie	nt, W/K						(39)m	= (37) + (3	38)m			
39)m= 51.84	51.62	51.4	50.31	50.09	49	49	48.78	49.44	50.09	50.53	50.97		_
Heat loss para	ameter (H	HLP). W/	′m²K						Average = = (39)m ÷	Sum(39) <sub>1</sub>	12 /12=	50.26	(39)
40)m= 0.58	0.58	0.57	0.56	0.56	0.55	0.55	0.54	0.55	0.56	0.56	0.57		
		<u> </u>	<u> </u>		<u> </u>	<u> </u>	!	,	Average =	Sum(40) <sub>1</sub>	12 /12=	0.56	(40)
Number of day	ys in mo	nth (Tab	le 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 hea	ting ene	rgy requi	irement:								kWh/ye	ear:	
Assumed occi	inancy	N									.62		(42)
if TFA > 13.			[1 - exp	(-0.0003	349 x (TF	A -13.9	)2)] + 0.0	0013 x (	ΓFA -13.		.02		(42)
if TFA £ 13.	•						<b></b>						
Annual averaç Reduce the annu									se target o		6.46		(43)
not more that 125	•		• •		-	-			J				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
lot water usage	in litres per	day for ea	<u> </u>			Table 1c x							
44)m= 106.11	102.25	98.39	94.53	90.67	86.82	86.82	90.67	94.53	98.39	102.25	106.11		
,	!	<u> </u>			<u> </u>			-	Γotal = Su	l m(44) <sub>112</sub> =	=	1157.54	(44
Energy content of	f hot water	used - cal	culated mo	onthly $= 4$ .	190 x Vd,r	n x nm x E	OTm / 3600	kWh/mon	th (see Ta	ables 1b, 1	c, 1d)		
45)m= 157.35	137.62	142.01	123.81	118.8	102.52	95	109.01	110.31	128.56	140.33	152.39		
						ı	•		Γotal = Su	m(45) <sub>112</sub> =	=	1517.71	(45
f instantaneous v	vater heati	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46	) to (61)		_			
46)m= 23.6	20.64	21.3	18.57	17.82	15.38	14.25	16.35	16.55	19.28	21.05	22.86		(46
Vater storage				.	/\/\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_4			1				
Storage volum	, ,		•			•		ime ves	sei		0		(47
f community f Otherwise if n	_			_			. ,	ars) anto	ar '∩' in <i>(</i>	<b>47</b> )			
Vater storage		not wate	) (tillo li	icidaes i	ristaritai	icous cc	JIIIDI DOII	cro, crite	, 0 111 (	71)			
a) If manufac		eclared l	oss facto	or is kno	wn (kWh	n/day):					0		(48
emperature f	actor fro	m Table	2b								0		(49
nergy lost fro	m water	storage	, kWh/ye	ear			(48) x (49)	=			0		(50
b) If manufac	turer's de	eclared o	cylinder l	oss fact	or is not	known:							
lot water stor	_			e 2 (kW	h/litre/da	ıy)					0		(51
f community h	•		on 4.3										
	nom ra		2h							-	0		(52 (53
olume factor		m iania									0		(55
olume factor emperature f	actor fro			oor			(47) = (54)	v (EQ) (	<b>50</b> \ .		_		/
olume factor emperature f energy lost fro	actor fro om water	· storage		ear			(47) x (51)	x (52) x (	53) =	-	0		
/olume factor Femperature f Energy lost fro Enter (50) or	actor fro om water (54) in (5	storage 55)	, kWh/ye							-	0		
/olume factor Femperature f Energy lost fro Enter (50) or Vater storage	actor from water (54) in (5 loss cal	storage 55) culated f	, kWh/ye	month	<u>.</u>		((56)m = (	55) × (41)ı	m		0		(54 (55
Volume factor Femperature f Energy lost fro Enter (50) or Water storage	actor from water (54) in (54) loss cal	storage 55) culated f	for each	month 0	0	0	((56)m = (	55) × (41)ı	n 0	0	0 0	iv Ll	(55
/olume factor Femperature f Energy lost fro Enter (50) or Vater storage	actor from water (54) in (54) loss cal	storage 55) culated f	for each	month 0		0	((56)m = (	55) × (41)ı	n 0	0	0 0	ix H	

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 an	d a cylinder thermostat)
(59)m =	0 0 0 0 (59)
Combi loss calculated for each month (61)m = (60) $\div$ 365 × (41)m	
(61)m= 50.96 46.03 50.14 46.62 46.21 42.81 44.24 46.2	21 46.62 50.14 49.32 50.96 (61)
Total heat required for water heating calculated for each month (62)r	$n = 0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$
(62)m= 208.31 183.65 192.15 170.43 165.01 145.33 139.24 155.	
Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter	er '0' if no solar contribution to water heating)
(add additional lines if FGHRS and/or WWHRS applies, see Appendi	
(63)m= 0 0 0 0 0 0 0 0	0 0 0 0 (63)
Output from water heater	
(64)m= 208.31 183.65 192.15 170.43 165.01 145.33 139.24 155.	22   156.93   178.7   189.65   203.35
	Output from water heater (annual) 112 2087.96 (64)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)m + (6	
(65)m= 65.06 57.27 59.75 52.82 51.05 44.79 42.65 47.8	
include (57)m in calculation of (65)m only if cylinder is in the dwelli	ng of not 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 Au	<del></del>
(66)m= 131.08 131.08 131.08 131.08 131.08 131.08 131.08 131.08	08 131.08 131.08 131.08 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also se	ee Table 5
(67)m= 23.05 20.48 16.65 12.61 9.42 7.96 8.6 11.1	7 15 19.04 22.23 23.69 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), a	also see Table 5
(68)m= 238.52 240.99 234.76 221.48 204.72 188.96 178.44 175.4	96 182.2 195.48 212.24 227.99 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also	see Table 5
(69)m= 36.11 36.11 36.11 36.11 36.11 36.11 36.11 36.11	1 36.11 36.11 36.11 (69)
Pumps and fans gains (Table 5a)	
(70)m= 3 3 3 3 3 3 3 3 3	3 3 3 (70)
Losses e.g. evaporation (negative values) (Table 5)	
(71)m= -104.86 -104.86 -104.86 -104.86 -104.86 -104.86 -104.86 -104.86 -104.86	86 -104.86 -104.86 -104.86 (71)
Water heating gains (Table 5)	
(72)m= 87.45 85.22 80.32 73.36 68.62 62.21 57.32 64.2	4 67.13 74.3 81.93 85.23 (72)
	)m + (69)m + (70)m + (71)m + (72)m
(73)m= 414.34 412.01 397.05 372.77 348.08 324.45 309.68 316.	
6. Solar gains:	323.00 334.13 301.72 402.24
Solar gains are calculated using solar flux from Table 6a and associated equations to	o convert to the applicable orientation.
Orientation: Access Factor Area Flux	g_ FF Gains
Table 6d m <sup>2</sup> Table 6a	Table 6b Table 6c (W)
North 0.9x 0.77 x 10.44 x 10.63 x	0.35 × 0.8 = 21.53 (74)
North 0.9x 0.77 x 10.44 x 20.32 x	0.35 × 0.8 = 41.15 (74)
0.01	0.55

North	rtocare	o arra irr	ipato irrio	Titloa by	4010101	001 000	rar a	1011. 1	irry acvi	iditioi	7 70 00	rtani t	Jourp	or an	101011	. 100	37107		
North	North	0.9x	0.77	X	10.	44	X	3	4.53	x	(	0.35	x		0.8		=	69.93	(74)
North	North	0.9x	0.77	x	10.	44	X	5:	5.46	x	(	0.35	×		0.8		=	112.33	(74)
North	North	0.9x	0.77	х	10.	44	x	7-	4.72	x	(	0.35	x		0.8		=	151.31	(74)
North	North	0.9x	0.77	x	10.	44	X	7:	9.99	x	(	0.35	×		0.8	一	=	161.99	(74)
North	North	0.9x	0.77	x	10.	44	X	7-	4.68	x		0.35	×		0.8		=	151.23	(74)
North	North	0.9x	0.77	X	10.	44	X	5	9.25	x	(	0.35	×		0.8		=	119.99	(74)
North	North	0.9x	0.77	X	10.	44	X	_		X	(	0.35	×		0.8		=	84.08	(74)
North	North	0.9x	0.77	x	10.	44	X	2	4.19	x	(	0.35	×		0.8		=	48.99	(74)
East	North	0.9x	0.77	X	10.	44	X	1:	3.12	x	(	0.35	×		0.8		=	26.57	(74)
East	North	0.9x	0.77	x	10.	44	X	8	3.86	x	(	0.35	×		0.8		=	17.95	(74)
East	East	0.9x	0.77	X	1.5	53	X	1	9.64	x	(	0.35	×		0.8		=	5.84	(76)
East	East	0.9x	0.77	X	1.5	53	X	3	8.42	x	(	0.35	×		0.8		=	11.42	(76)
East	East	0.9x	0.77	x	1.5	53	X	6	3.27	x	(	0.35	X		0.8		=	18.81	(76)
East	East	0.9x	0.77	×	1.5	53	x	9:	2.28	x		0.35	×		0.8	一	=	27.43	(76)
East	East	0.9x		×			x			x			X			一	=		(76)
East 0.9x 0.77 x 1.53 x 94.68 x 0.35 x 0.8 = 28.14 (76)  East 0.9x 0.77 x 1.53 x 45.59 x 0.35 x 0.8 = 21.88 (76)  East 0.9x 0.77 x 1.53 x 45.59 x 0.35 x 0.8 = 21.88 (76)  East 0.9x 0.77 x 1.53 x 45.59 x 0.35 x 0.8 = 13.55 (76)  East 0.9x 0.77 x 1.53 x 24.49 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 7.28 (76)  Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m  (83)m = 27.37 52.58 88.74 139.76 184.93 196.4 184 148.13 105.95 62.54 33.85 22.75 (83)  Total gains – internal and solar (84)m = (73)m + (83)m, watts  (84)m = 441.71 464.58 485.79 512.53 533.02 520.85 493.68 464.83 435.61 416.69 415.56 424.99 (84)  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 = 1 1 0.99 0.96 0.83 0.6 0.44 0.48 0.76 0.97 1 1 (86)  Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)  (87)m = 20.5 20.57 20.69 20.86 20.97 21 21 21 20.99 20.86 20.66 20.49 (87)  Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m = 20.45 20.45 20.45 20.47 20.47 20.48 20.48 20.48 20.48 20.47 20.47 20.47 20.46 20.46 (88)  Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m = 19.77 19.87 20.06 20.3 20.44 20.48 20.48 20.48 20.47 20.47 20.31 20.01 19.77	East	0.9x	0.77	x	1.5	53	X	11	5.77	x		0.35	×		0.8		=	34.42	(76)
East 0.9x 0.77 x 1.53 x 73.59 x 0.35 x 0.8 = 21.88 (76)  East 0.9x 0.77 x 1.53 x 45.59 x 0.35 x 0.8 = 13.55 (76)  East 0.9x 0.77 x 1.53 x 24.49 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 7.28 (76)  East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 4.8 (76)  Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m  (83)m = 27.37 52.58 88.74 139.76 184.93 196.4 184 148.13 105.95 62.54 33.85 22.75 (83)  Total gains – internal and solar (84)m = (73)m + (83)m, watts  (84)m = 441.71 464.58 485.79 512.53 533.02 520.85 493.68 464.83 435.61 416.69 415.56 424.99 (84)  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 = 1 1 0.99 0.96 0.83 0.6 0.44 0.48 0.76 0.97 1 1 (86)  Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)  (87)m = 20.5 20.57 20.69 20.86 20.97 21 21 21 20.99 20.86 20.66 20.49 (87)  Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m = 20.45 20.45 20.45 20.47 20.47 20.48 20.48 20.48 20.48 20.47 20.47 20.47 20.46 20.46 (88)  Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  (89)m = 1 1 0.99 0.95 0.8 0.55 0.38 0.43 0.71 0.96 1 1 1 (89)  Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m = 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.47 20.31 20.01 19.77	East	0.9x	0.77	X	1.5	53	X	11	0.22	x	(	0.35	×		0.8		=	32.76	(76)
East	East	0.9x	0.77	x	1.5	53	x	9.	4.68	x	(	0.35	x		0.8		=	28.14	(76)
East	East	0.9x	0.77	X	1.5	53	X	7:	3.59	x	(	0.35	×		0.8	一	=	21.88	(76)
East 0.9x 0.77 x 1.53 x 16.15 x 0.35 x 0.8 = 4.8 (76)  Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m  (83)m = 27.37 52.58 88.74 139.76 184.93 196.4 184 148.13 105.95 62.54 33.85 22.75 (83)  Total gains – internal and solar (84)m = (73)m + (83)m , watts  (84)m = 441.71 464.58 485.79 512.53 533.02 520.85 493.68 464.83 435.61 416.69 415.56 424.99 (84)  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 = 1 1 0.99 0.96 0.83 0.6 0.44 0.48 0.76 0.97 1 1 1 (86)  Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)  (87)m = 20.5 20.57 20.69 20.86 20.97 21 21 21 20.99 20.86 20.66 20.49 (87)  Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m = 20.45 20.45 20.45 20.47 20.47 20.48 20.48 20.48 20.47 20.47 20.46 20.46 (88)  Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  (89)m = 1 1 0.99 0.95 0.8 0.55 0.38 0.43 0.71 0.96 1 1 (89)  Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m = 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.47 20.31 20.01 19.77 (90)	East	0.9x	0.77	х	1.5	53	x	4	5.59	x	(	0.35	x		0.8		=	13.55	(76)
Solar gains in watts, calculated for each month  (83)m = Sum(74)m(82)m  (83)m = 27.37	East	0.9x	0.77	x	1.5	53	x	2	4.49	x	(	0.35	x		0.8		=	7.28	(76)
R83 me   27.37   52.58   88.74   139.76   184.93   196.4   184   148.13   105.95   62.54   33.85   22.75     Total gains – internal and solar (84)m = (73)m + (83)m , watts     (84)me   441.71   464.58   485.79   512.53   533.02   520.85   493.68   464.83   435.61   416.69   415.56   424.99     The mean internal temperature (heating season)	East	0.9x	0.77	x	1.5	53	X	1	6.15	x	(	0.35	X		0.8		=	4.8	(76)
R83 me   27.37   52.58   88.74   139.76   184.93   196.4   184   148.13   105.95   62.54   33.85   22.75     Total gains – internal and solar (84)m = (73)m + (83)m , watts     (84)me   441.71   464.58   485.79   512.53   533.02   520.85   493.68   464.83   435.61   416.69   415.56   424.99     The mean internal temperature (heating season)		_								•									
Total gains – internal and solar (84)m = (73)m + (83)m , watts  (84)m= 441.71  464.58  485.79  512.53  533.02  520.85  493.68  464.83  435.61  416.69  415.56  424.99  (84)  7. Mean internal temperature (heating season)  Temperature during heating periods in the living area from Table 9, Th1 (°C)	Solar g	jains in	watts, ca	lculated	for eac	h month	1	_		(83)m	n = Sun	n(74)m .	(82)n	1				_	
(84)m=       441.71       464.58       485.79       512.53       533.02       520.85       493.68       464.83       435.61       416.69       415.56       424.99       (84)         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= 1       1       0.99       0.96       0.83       0.6       0.44       0.48       0.76       0.97       1       1       (86)         Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)         (87)m= 20.5       20.57       20.69       20.86       20.97       21       21       21       20.99       20.86       20.49       (87)         Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)         (88)m= 20.45       20.45       20.45       20.47       20.48       20.48       20.47       20.47       20.46       20.48         Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)         (89)m= 1       1       1						<u> </u>				148	.13	105.95	62.5	4 :	33.85	22.	75		(83)
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= 1 1 0.99 0.96 0.83 0.6 0.44 0.48 0.76 0.97 1 1 1 (86)  Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)  (87)m= 20.5 20.57 20.69 20.86 20.97 21 21 21 20.99 20.86 20.66 20.49  Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m= 20.45 20.45 20.45 20.47 20.47 20.48 20.48 20.48 20.47 20.47 20.46 20.46 (88)  Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  (89)m= 1 1 0.99 0.95 0.8 0.55 0.38 0.43 0.71 0.96 1 1 (89)  Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m= 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.47 20.31 20.01 19.77 (90)	Total g	ains – i	nternal a	nd solar	(84)m =	<u> </u>	<del>,</del>	<del>'</del>										1	
Temperature during heating periods in the living area from Table 9, Th1 (°C)  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= 1 1 0.99 0.96 0.83 0.6 0.44 0.48 0.76 0.97 1 1 1  Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)  (87)m= 20.5 20.57 20.69 20.86 20.97 21 21 21 20.99 20.86 20.66 20.49  Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m= 20.45 20.45 20.45 20.47 20.47 20.48 20.48 20.48 20.48 20.47 20.47 20.46 20.46  Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  (89)m= 1 1 0.99 0.95 0.8 0.55 0.38 0.43 0.71 0.96 1 1 (89)  Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m= 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.48 20.47 20.31 20.01 19.77 (90)	(84)m=	441.71	464.58	485.79	512.53	533.02	5	20.85	493.68	464	.83 4	435.61	416.6	69 4	15.56	424	.99		(84)
Utilisation factor for gains for living area, h1,m (see Table 9a)    Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec	7. Me	an inter	nal temp	erature	(heating	seasor	า)												
Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec	Temp	erature	during h	eating p	eriods ir	n the liv	ing	area f	rom Tal	ole 9	, Th1	(°C)						21	(85)
(86)m=       1       1       0.99       0.96       0.83       0.6       0.44       0.48       0.76       0.97       1       1       (86)         Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)         (87)m=       20.5       20.57       20.69       20.86       20.97       21       21       21       20.99       20.86       20.66       20.49       (87)         Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)         (88)m=       20.45       20.45       20.47       20.47       20.48       20.48       20.47       20.47       20.46       20.46       (88)         Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)         (89)m=       1       1       0.99       0.95       0.8       0.55       0.38       0.43       0.71       0.96       1       1       (89)         Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)         (90)m=       19.77       19.87       20.05       20.3       20.44       20.48       20.48       20.47       20.31       20.01       19.77       (90)	Utilisa	ation fac	tor for ga	ains for l	iving are	ea, h1,n	n (s	ее Та	ble 9a)									•	
Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)  (87)m= 20.5 20.57 20.69 20.86 20.97 21 21 21 20.99 20.86 20.66 20.49 (87)  Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m= 20.45 20.45 20.45 20.47 20.47 20.48 20.48 20.48 20.47 20.47 20.46 20.46 (88)  Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  (89)m= 1 1 0.99 0.95 0.8 0.55 0.38 0.43 0.71 0.96 1 1 (89)  Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m= 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.48 20.47 20.31 20.01 19.77 (90)		Jan	Feb	Mar	Apr	May		Jun	Jul	Α	ug	Sep	Oc	t	Nov	D	ec		
(87)m=       20.5       20.57       20.69       20.86       20.97       21       21       21       20.99       20.86       20.66       20.49         Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)         (88)m=       20.45       20.45       20.47       20.47       20.48       20.48       20.48       20.47       20.47       20.46       20.46         Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)         (89)m=       1       1       0.99       0.95       0.8       0.55       0.38       0.43       0.71       0.96       1       1       (89)         Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)         (90)m=       19.77       19.87       20.05       20.3       20.44       20.48       20.48       20.47       20.31       20.01       19.77	(86)m=	1	1	0.99	0.96	0.83		0.6	0.44	0.4	18	0.76	0.97	<u> </u>	1	1			(86)
Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)  (88)m= 20.45   20.45   20.45   20.47   20.47   20.48   20.48   20.48   20.47   20.47   20.46   20.46    Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)  (89)m= 1	Mean	<u>inte</u> rna	l tempera	ature in	living are	<u>ea T</u> 1 (f	ollo	w ster	os 3 to 7	<u>7 in</u> T	able :	9c)_						_	
(88)m=       20.45       20.45       20.47       20.47       20.48       20.48       20.48       20.47       20.47       20.46       20.46         Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)         (89)m=       1       1       0.99       0.95       0.8       0.55       0.38       0.43       0.71       0.96       1       1       1       (89)         Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)         (90)m=       19.77       19.87       20.05       20.3       20.44       20.48       20.48       20.47       20.31       20.01       19.77       (90)	(87)m=	20.5	20.57	20.69	20.86	20.97		21	21	2	1	20.99	20.8	6 2	20.66	20.	49		(87)
(88)m=       20.45       20.45       20.47       20.47       20.48       20.48       20.48       20.47       20.47       20.46       20.46         Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)         (89)m=       1       1       0.99       0.95       0.8       0.55       0.38       0.43       0.71       0.96       1       1       1       (89)         Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)         (90)m=       19.77       19.87       20.05       20.3       20.44       20.48       20.48       20.47       20.31       20.01       19.77       (90)	Temp	erature	during h	eating p	eriods ir	n rest of	dw	elling	from Ta	able 9	9, Th2	2 (°C)		-					
(89)m=     1     1     0.99     0.95     0.8     0.55     0.38     0.43     0.71     0.96     1     1       Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)       (90)m=     19.77     19.87     20.05     20.3     20.44     20.48     20.48     20.48     20.47     20.31     20.01     19.77       (90)	•				1	i	_	Ť		1	- 1	<u> </u>	20.4	7 2	20.46	20.	46		(88)
(89)m=     1     1     0.99     0.95     0.8     0.55     0.38     0.43     0.71     0.96     1     1       Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)       (90)m=     19.77     19.87     20.05     20.3     20.44     20.48     20.48     20.48     20.47     20.31     20.01     19.77       (90)	l Itilies	ation fac	tor for a	ains for	rest of d	wellina	h2	.m (se	e Table	9a)						•		•	
Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)  (90)m= 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.47 20.31 20.01 19.77 (90)			T -				$\overline{}$				13	0.71	0.96	; T	1	1			(89)
(90)m= 19.77 19.87 20.05 20.3 20.44 20.48 20.48 20.48 20.47 20.31 20.01 19.77 (90)		intorna	l tompor			!												I	•
			<del></del>			1	Ť	<u> </u>		·				1   -	20 01	10	77		(90)
0.39	(30)1112	19.77	19.01	20.00	20.3	20.44	<u></u>	-0.40	20.40		10						<i>, ,</i>	0.30	<b>_</b> ` `
													<u>-</u>	9	(	·/ ·		0.58	(51)

Mean internation (92)m= 20.05		otura (fa	r +b ~b	امبيام مام	lina\ fl	ΛΤ1	. /4 fl	Λ) Το					
	<del></del>	20.3	20.52	20.65	20.68	20.68	+ (1 – 1L 20.68	20.67	20.52	20.26	20.05		(92)
Apply adjust		L								20.20	20.00		(02)
(93)m= 19.9	19.99	20.15	20.37	20.5	20.53	20.53	20.53	20.52	20.37	20.11	19.9		(93)
8. Space he			20101		20.00	20.00	20.00	20.02	20.0.	20111			
Set Ti to the the utilisation	mean int	ternal ten	•		ed at ste	ep 11 of	Table 9l	o, so tha	t Ti,m=(	76)m an	d re-calc	ulate	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation fa					• • • • • • • • • • • • • • • • • • • •		7.0.9	- Gop					
(94)m= 1	1	0.99	0.95	0.8	0.56	0.39	0.43	0.72	0.96	0.99	1		(94)
Useful gains	, hmGm	W = (94)	l)m x (84	4)m									
(95)m= 440.85	462.83	480.34	485.33	425.49	290	192.54	201.48	312.77	399.53	413.32	424.38		(95)
Monthly ave	rage exte	rnal tem	perature	from Ta	able 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 ra	te for mea	an intern	al tempe	erature, l	_m , W =	=[(39)m	x [(93)m	– (96)m	]				
(97)m= 808.93		701.54	577	440.68	290.51	192.56	201.52	317.33	489.48	657.6	800.02		(97)
Space heating										·	1		
(98)m= 273.85	212.47	164.57	66	11.3	0	0	0	0	66.93	175.89	279.47		_
							Tota	l per year	(kWh/year	) = Sum(9	8) <sub>15,912</sub> =	1250.48	(98)
Space heati	ng require	ement in	kWh/m²	²/year								13.94	(99)
9a. Energy re	quiremer	nts – Indi	vidual h	eating sy	/stems i	ncluding	micro-C	CHP)					
Space heat	ing:												
Fraction of s	space hea	at from se	econdar	y/supple	mentary	system						0	(201)
Fraction of s	space hea	at from m	ain syst	em(s)			(202) = 1 -	- (201) =			Ī	1	(202)
Fraction of to	otal heati	ng from r	main sys	stem 1			(204) = (2	02) <b>x</b> [1 –	(203)] =			1	(204)
Efficiency of	main spa	ace heati	ng syste	em 1							[	90.3	(206)
Efficiency of	•		•		g system	າ, %						0	(208)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	<del>_</del> ar
Space heati	ng require	ement (c	alculated	d above)								·	
273.85	212.47	164.57	66	11.3	0	0	0	0	66.93	175.89	279.47		
(211)m = {[(98	8)m x (20	)4)] } x 1	00 ÷ (20	)6)									(211)
303.27	235.29	182.25	73.09	12.51	0	0	0	0	74.11	194.78	309.5		
	na fuol (c						Tota	l (kWh/yea	ar) =Sum(2	211),15,1012	=	1384.81	(211)
Space heati	ila lael (S	econdary	/), kWh/	month			Tota	l (kWh/yea	ar) =Sum(2	211) <sub>15,1012</sub>	=	1384.81	(211)
Space heatin = {[(98)m x (2	• .	-		month			Tota	l (kWh/yea	ar) =Sum(2	211) <sub>15,1012</sub>	=	1384.81	(211)
•	• .	-		month 0	0	0	Tota	l (kWh/yea	ar) =Sum(2	0	0	1384.81	(211)
= {[(98)m x (2	201)] } x 1	00 ÷ (20	8)		0	0	0		0	0	0	1384.81	(211)
= {[(98)m x (2	201)] } x 1	00 ÷ (20	8)		0	0	0	0	0	0	0		_
$= \{[(98)m \times (2000)] = (215)m	201)] } x 1	00 ÷ (20	8) 0	0	0	0	0	0	0	0	0		_
= $\{[(98)\text{m x } (205)\text{m} = 0000]$	201)] } x 1 0  ng water hea	00 ÷ (20	8) 0	0	0 145.33	0 139.24	0	0	0	0	0		_
$= \{[(98)m \times (2000)] $ (215)m= 0  Water heating Output from v	201)] } x 1 0  ng water hea 183.65	00 ÷ (20) 0 ter (calcutes) 192.15	8) 0 ulated at	o bove)			0 Tota	0 I (kWh/yea	0 ar) =Sum(2	0215) <sub>15,1012</sub>	0		_
= {[(98)m x (2 (215)m= 0 <b>Water heatin</b> Output from v 208.31	201)] } x 1 0  ng water hea 183.65 water hea	00 ÷ (20) 0 ter (calcutes) 192.15	8) 0 ulated at	o bove)			0 Tota	0 I (kWh/yea	0 ar) =Sum(2	0215) <sub>15,1012</sub>	0	0	(215)
= {[(98)m x (2 (215)m= 0 Water heatin Output from v 208.31 Efficiency of v (217)m= 86.03 Fuel for water	201)] } x 1 0  ng water hea 183.65 water hea 85.74 r heating,	00 ÷ (200 0 ter (calcuter (calcuter (state) 192.15 ter (state) 85.04 kWh/mc	8) 0 ulated at 170.43 83.4	0 bove) 165.01	145.33	139.24	0 Tota 155.22	0 I (kWh/yea 156.93	0 ar) =Sum(2 178.7	0 215) <sub>15,1012</sub> 189.65	203.35	0	(215)
= {[(98)m x (2 (215)m= 0 <b>Water heatin</b> Output from v 208.31 Efficiency of v (217)m= 86.03 Fuel for water (219)m = (64	201)] } x 1  0  water hea  183.65  water hea  85.74  r heating,	00 ÷ (200 0  ter (calcumos) 192.15  ater  85.04  kWh/mod) 5 ÷ (217)	8) 0 ulated al 170.43 83.4 onth m	0 bove) 165.01 81.54	145.33	139.24	0 Tota 155.22	0 I (kWh/yea 156.93	0 ar) =Sum(2 178.7 83.34	0 215) <sub>15,1012</sub> 189.65	0 = 203.35 86.13	0	(215)
= {[(98)m x (2 (215)m= 0 Water heatin Output from v 208.31 Efficiency of v (217)m= 86.03 Fuel for water	201)] } x 1  0  water hea  183.65  water hea  85.74  r heating,	00 ÷ (200 0 ter (calcuter (calcuter (state) 192.15 ter (state) 85.04 kWh/mc	8) 0 ulated at 170.43 83.4	0 bove) 165.01	145.33	139.24	0 Tota 155.22 81	0 I (kWh/yea 156.93	0 178.7 83.34	0 215) <sub>15,1012</sub> 189.65	203.35	0	(215)

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

, , , , , , , , , , , , , , , , , , , ,	,	, , , , , , , , , , , , , , , , , , , ,			
Annual totals		kWh/year	г	kWh/year	,
Space heating fuel used, main system 1				1384.81	_
Water heating fuel used				2498.73	
Electricity for pumps, fans and electric keep-hot					
mechanical ventilation - balanced, extract or pos	sitive input from outside		218.89		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum of (	230a)(230g) =		248.89	(231)
Electricity for lighting				407.13	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =			4539.56	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	Emission fact kg CO2/kWh	or	Emissions kg CO2/yea	ır
Space heating (main system 1)	(211) x	0.216	= [	299.12	(261)
Space heating (secondary)	(215) x	0.519	= [	0	(263)
Water heating	(219) x	0.216	= [	539.73	(264)
Space and water heating	(261) + (262) + (263) + (264	•) =	[	838.84	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519	= [	129.17	(267)
Electricity for lighting	(232) x	0.519	= [	211.3	(268)
Total CO2, kg/year		sum of (265)(271) =	[	1179.32	(272)

El rating (section 14)

(274)

		l Jeor F	Details:						
Access Now	Dobygo Down	– USEF L		_ NI	L		CTDO	000000	
Assessor Name: Software Name:	Robyn Berry Stroma FSAP 2012		Strom Softwa					036659 on: 1.0.5.16	
Software Hame.		Property	Address			ey Rd	VOISIC	7.0.0.10	
Address :	G02 BP Finchley Rd, Lond								
1. Overall dwelling dime	ensions:								
		Are	a(m²)	1	Av. He	eight(m)		Volume(m³	_
Ground floor			19.44	(1a) x	2	2.54	(2a) =	125.59	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)+(1	n)	19.44	(4)					
Dwelling volume				(3a)+(3b	)+(3c)+(3c	d)+(3e)+	(3n) =	125.59	(5)
2. Ventilation rate:									
	main seconda heating heating		other		total			m³ per hou	r
Number of chimneys	0 + 0	+	0	= [	0	X 4	10 =	0	(6a)
Number of open flues	0 + 0	+	0	=	0	x 2	20 =	0	(6b)
Number of intermittent fa	ans				0	x 1	10 =	0	(7a)
Number of passive vents	3			Ē	0	x 1	10 =	0	(7b)
Number of flueless gas f	ires			F	0	x 4	10 =	0	(7c)
				L					
							Air ch	anges per ho	ur
	ys, flues and fans = $(6a)+(6b)+$				0		÷ (5) =	0	(8)
	been carried out or is intended, proce	ed to (17),	otherwise (	continue fr	rom (9) to	(16)			7(0)
Number of storeys in t Additional infiltration	ne dweiling (ns)					[(9)-	·1]x0.1 =	0	(9) (10)
	0.25 for steel or timber frame of	or 0.35 fo	r masoni	ry consti	ruction	[(0)	17.0.1 -	0	(11)
	resent, use the value corresponding	to the grea	ter wall are	a (after					_
deducting areas of openi	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	,	, (ooa		00				0	(13)
•	s and doors draught stripped							0	(14)
Window infiltration			0.25 - [0.2	2 x (14) ÷ 1	100] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13)	+ (15) =		0	(16)
·	q50, expressed in cubic metr	•	•	•	etre of e	envelope	area	3	(17)
·	lity value, then $(18) = [(17) \div 20] +$					1		0.15	(18)
Number of sides sheltere	es if a pressurisation test has been do ed	one or a de	gree air pe	rmeability	is being u	sea		3	(19)
Shelter factor	, a		(20) = 1 -	[0.075 x (	19)] =			0.78	(20)
Infiltration rate incorpora	ting shelter factor		(21) = (18	s) x (20) =				0.12	(21)
Infiltration rate modified f	for 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 ∸ 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		
· LL			1			I.		ı	

Adjusted infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14		
Calculate effecture of the Calculate of		_	rate for t	he appli	cable ca	se	-	-	-	-			
If exhaust air h			endix N (2	3h) <i>– (2</i> 3a	a) × Fmv (e	equation (1	NS)) othe	rwise (23h	) = (23a)			0.5	(23
If balanced with									) = (20a)			0.5	(23
a) If balance		•	•	_					2h\m ı (	23P) ^ [	1 (22a)	76.5	(23
(24a)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	<del>-</del> 100]	(24
b) If balance	ļ	<u> </u>			l	<u> </u>	ļ	<u> </u>	<u>l</u>	<u>Į</u>	0.20		•
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h	<u> </u>			-								l	`
,				•	•		c) = (22k)		.5 × (23k	o)			
24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
d) If natural if (22b)n				•	•		on from I 0.5 + [(2		0.51	•		•	
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change	rate - er	iter (24a	or (24b	o) or (24	c) or (24	d) in box	(25)				ı	
25)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		(25
2 Hoot losse	e and he	ot lose r	oromote	or:			•			1			
3. Heat losse <b>ELEMENT</b>	Gros	SS	Openin	gs	Net Ar		U-valı		AXU		k-value		A X k
Doors	area	(1112)	m	<b>-</b>	A ,r		W/m2	_	(W/	N)	kJ/m²-I	^ r	kJ/K
Vindows Type	、1				2.1	X	1.2 /[1/( 0.9 )+	0.041	2.52	=			(2)
					6.649	= .			5.78	=			(2
Vindows Type	<i>;</i>				3.035	=	/[1/( 0.9 )+		2.64	╡,			(2
Floor					49.44	_	0.1	=	4.9444			_	(2
Walls Type1	27.2	_	9.68	_	17.58	=	0.15	_  =	2.64			┥	(2
Nalls Type2	20.8		2.1		18.71	X	0.14	=	2.65				(29
Total area of e	lements	, m²			97.51								(3
Party wall					29.03	3 X	0	=	0				(3:
Party ceiling					49.44								(3:
for windows and it include the area						ated using	g formula 1	/[(1/U-valu	ie)+0.04] a	as given in	paragraph	n 3.2	
Fabric heat los				s and part	itions		(26)(30)	+ (32) =				21.16	(3:
Heat capacity		•	• ,				. , . ,		(30) + (3	2) + (32a)	(32e) =	8675	(34
Thermal mass		,	P = Cm ÷	- TFA) ir	n kJ/m²K			,	tive Value	, , ,	(= = )	250	(3!
For design assess	sments wh	ere the de	tails of the	•			ecisely the	indicative	values of	TMP in T	able 1f	200	
Thermal bridge				using Ap	pendix ł	<						4.22	(3
details of therma	•	,		• .	•								(``
Total fabric he	at loss							(33) +	(36) =			25.38	(3
entilation hea	at loss ca	alculated	l monthly	/				(38)m	= 0.33 × (	(25)m x (5	)		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
38)m= 11.01	10.89	10.77	10.17	10.05	9.45	9.45	9.33	9.69	10.05	10.29	10.53		(3
Heat transfer of	coefficier	nt, W/K						(39)m	= (37) + (	38)m			
39)m= 36.39	36.27	36.15	35.55	35.43	34.82	34.82	34.7	35.06	35.43	35.67	35.91		
	0.\/===:==	10516/	(SVD 0 03)	- http://ww	ww.stroma	com			Average =	Sum(39)	ı <sub>12</sub> /12=	35.5₽ <sub>aç</sub>	10 2 d(3/

eat lo	ss para	meter (F	ILP), W/	m²K					(40)m	= (39)m ÷	- (4)			
0)m=	0.74	0.73	0.73	0.72	0.72	0.7	0.7	0.7	0.71	0.72	0.72	0.73		
			-41- /T-1-1	l- 4-\		-	-	<u>-</u>	,	Average =	Sum(40) <sub>1</sub>	12 /12=	0.72	(
umbe 	i		nth (Tab		Mov	lup	lul	Λιια	Son	Oct	Nov	Doo		
1)m=	Jan 31	Feb 28	Mar 31	Apr 30	May 31	Jun 30	Jul 31	Aug 31	Sep 30	Oct 31	Nov 30	Dec 31		(
	31	20	31	30	31	30	31	31	30	31	30	31		(
. Wa	ter heat	ing ener	gy requi	rement:								kWh/ye	ear:	
sum	ed occu	pancy, <b>i</b>	N									67		(
if TF.		9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9	)2)] + 0.0	0013 x (	ΓFA -13		.07		(
nual	l averag	e hot wa						(25 x N)				3.95		(
		-				lwelling is hot and co	-	to achieve	a water us	se target o	of <sup>1</sup>			
								۸۰۰۵	Con	Oct	Nov	Doo		
t wate	Jan er usage in	Feb n litres per	Mar day for ea	Apr ach month	May $Vd, m = fa$	Jun ctor from 7	Jul Table 1c x	Aug <i>(4</i> 3)	Sep	Oct	Nov	Dec		
l)m=	81.35	78.39	75.43	72.47	69.51	66.56	66.56	69.51	72.47	75.43	78.39	81.35		
, <u> </u>	01.00	70.00	70.10	12.11	00.01	00.00	00.00	00.01			m(44) <sub>112</sub> =		887.42	
ergy c	content of	hot water	used - cal	culated mo	onthly $= 4$ .	190 x Vd,r	n x nm x E	OTm / 3600						_
i)m=	120.63	105.51	108.87	94.92	91.08	78.59	72.83	83.57	84.57	98.56	107.58	116.83		
										Total = Su	m(45) <sub>112</sub> =	=	1163.54	
nstant י	aneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46,	) to (61)					
s)m=	18.1	15.83	16.33	14.24	13.66	11.79	10.92	12.54	12.69	14.78	16.14	17.52		
	storage		includin	a any c	olar or M	WHDC	etorago	within sa	ma vac	cal		0		
_		,				nter 110	•		anic voo	501		0		
	-	_			_			mbi boil	ers) ente	er '0' in (	(47)			
	storage			`					,	·	,			
If m	anufact	urer's de	eclared l	oss facto	or is kno	wn (kWh	n/day):					0		
mpe	rature fa	actor fro	m Table	2b								0		
			storage	-				(48) x (49)	=			0		
				-		or is not								
		•			e 2 (kW	h/litre/da	ıy)					0		
	-	eating s from Tal	ee section	011 4.3								0		
			m Table	2b								0		
•			storage		ear			(47) x (51)	x (52) x (	53) =		0		
		54) in (5	_	, 100 VIII/ y C	Jui			(, (0.)	/	30)		0		
	. ,	, ,	culated f	or each	month			((56)m = (	55) × (41)ı	m		<u> </u>		
)m=	0	0	0	0	0	0	0	0	0	0	0	0		
	-	-	·					-		_		m Appendi	ix H	
)m=	0	0	0	0	0	0	0	0	0	0	0	0		
mar T	v circuit	loss (on	nual) fra	m Table	. 3			ı				0		
	•	,	nual) fro			59)m = 1	(58) ± 36	65 × (41)	m			·		
	-					•	. ,	ng and a		r thermo	stat)			
HIOU									. ,	•				

_	ss calcula		r			ì ´	<del>`</del>	Ť						1	
` ' _	41.45 36.	!	3.44	35.74	35.42	32.8	!		35.42	35.74	38.44	38.66	41.45		(61)
_	<del></del>							Ť			(45)m +	<del>ì ´</del>	(57)m +	(59)m + (61)m	
(62)m= 1			7.31	130.66	126.5	111.			118.99	120.31	137	146.24	158.28	İ	(62)
	/ input calcul						-				r contribu	tion to wate	er heating)		
` <b>—</b>	litional line					<del></del>		Appe		<del>´</del>				1	(00)
(63)m=	0 0		0	0	0	0	0		0	0	0	0	0	İ	(63)
· -	om water							-		1	1	1	1	1	
(64)m= 1	62.09 141	59   14	7.31	130.66	126.5	111.	42 106.	74	118.99	120.31	137	146.24	158.28		7,04)
										put from w		,		1607.13	(64)
` <b>—</b>	ns from wa		<del>-</del>			<del>-</del>		<del>-</del> -		<del>-</del>	<del>-``                                   </del>	+ (57)m	+ (59)m	]	
(65)m=	50.47 44	1 45	5.81	40.5	39.14	34.3	32.6	9	36.64	37.05	42.38	45.44	49.21	İ	(65)
include	e (57)m in	calcula	tion o	of (65)m	only if c	ylind	er is in th	ne dv	welling	or hot w	ater is f	rom com	munity h	eating	
5. Inter	nal gains	see Ta	ble 5	and 5a)	):										
Metab <u>oli</u>	c gains (Ta	able 5),	Watt	s						_					
	Jan F	eb M	Mar	Apr	May	Jι	n Ju	I	Aug	Sep	Oct	Nov	Dec		
(66)m=	83.69 83.	69 83	3.69	83.69	83.69	83.6	83.6	9	83.69	83.69	83.69	83.69	83.69		(66)
Lighting	gains (cald	ulated	in Ap	pendix l	L, equat	ion L	9 or L9a)	), als	so see	Table 5					
(67)m=	13.12 11.	65 9	.48	7.17	5.36	4.5	3 4.89	9	6.36	8.54	10.84	12.65	13.48		(67)
Applianc	es gains (	alculat	ted in	Append	dix L, eq	uatio	n L13 or	L13a	a), als	o see Ta	ble 5		-		
(68)m= 1	45.79 147	.3 14	3.49	135.37	125.13	115	.5 109.0	07	107.56	111.37	119.48	129.73	139.36		(68)
Cooking	gains (cal	culated	in Ap	pendix	L, equat	tion L	15 or L1	5a),	also s	ee Table	5		-		
(69)m=	31.37 31.	37 31	1.37	31.37	31.37	31.3	31.3	37	31.37	31.37	31.37	31.37	31.37		(69)
Pumps a	ind fans ga	ins (Ta	able 5	a)			•	•							
(70)m=	3 3		3	3	3	3	3		3	3	3	3	3		(70)
Losses e	g. evapoi	ation (r	negati	ive valu	es) (Tab	le 5)	•			•	•	•	•	'	
	66.95 -66		6.95	-66.95	-66.95	-66.	95 -66.9	95	-66.95	-66.95	-66.95	-66.95	-66.95		(71)
Water he	eating gain	s (Tabl	e 5)				•			•	!	•	!	ı	
(72)m=	67.84 65.	63 61	1.57	56.24	52.61	47.6	69 43.9	94	49.25	51.46	56.96	63.11	66.14	[	(72)
Total int	ernal gair	ıs =					(66)m + (6	i7)m +	+ (68)m	+ (69)m +	(70)m + (7	71)m + (72)	)m	I	
(73)m= 2	277.86 275	69 26	5.65	249.9	234.2	218.	83 209.0	01 :	214.27	222.47	238.39	256.59	270.09		(73)
6. Solar	gains:	<u> </u>	<u>'</u>												
Solar gair	ns are calcula	ited using	g solar	flux from	Table 6a	and as	sociated e	quatio	ons to c	onvert to th	ne applical	ble orientat	tion.		
Orientati	on: Acce		or	Area			Flux			$g_{-}$		FF		Gains	
	Table	6d		m²			Table 6a	à	-	Table 6b	Т	able 6c		(W)	
Southeas	t <sub>0.9x</sub>	).77	×	3.0	)4	x	36.79		x	0.35	x [	0.8	=	21.67	(77)
Southeas	t <sub>0.9x</sub>	).77	X	3.0	)4	x	62.67		x	0.35	x	0.8	=	36.91	(77)
Southeas	t <sub>0.9x</sub>	).77	X	3.0	)4	x	85.75		x	0.35	x	0.8	=	50.5	(77)
Southeas	t <sub>0.9x</sub>	).77	X	3.0	)4	x	106.25		x	0.35	×	0.8		62.57	(77)
Southeas	t <sub>0.9x</sub>	).77	x	3.0	)4	x	119.01		x	0.35	x	0.8	=	70.09	(77)

rtoount	ourid ii	.,0 0.10 11110						,									
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	1	18.15	x	0.35	5	x	0.8			69.58	(77)
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	1	13.91	x	0.35	5	x	0.8	_ =		67.08	(77)
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	1	04.39	x	0.35	5	x	0.8			61.48	(77)
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	9	2.85	x	0.35	5	x	0.8			54.68	(77)
Southea	ast <mark>0.9x</mark> [	0.77	X	3.0	)4	X	6	9.27	x	0.35	5	x	0.8	_ =		40.79	(77)
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	4	4.07	x	0.35	5	x	0.8			25.95	(77)
Southea	ast <mark>0.9x</mark>	0.77	X	3.0	)4	x	3	31.49	x	0.35	5	x	0.8			18.54	(77)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	55	x	3	86.79		0.35	5	x	0.8			47.47	(79)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	i5	X	6	32.67	]	0.35	5	x	0.8			80.86	(79)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	55	X	8	35.75	]	0.35	5	x	0.8			110.64	(79)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	55	X	1	06.25	]	0.35	5	x	0.8	_ =		137.08	(79)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	55	X	1	19.01	ĺ	0.35	5	x	0.8	╡ -		153.54	(79)
Southw	est <sub>0.9x</sub>	0.77	x	6.6	55	X	1	18.15	ĺ	0.35	5	x	0.8	╡ =		152.43	(79)
Southw	est <sub>0.9x</sub>	0.77	х	6.6	55	X	1	13.91	ĺ	0.35	5	x	0.8	<u> </u>		146.96	(79)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	55	X	1	04.39	ĺ	0.35	5	x	0.8			134.68	(79)
Southw	est <sub>0.9x</sub>	0.77	x	6.6	55	X	9	2.85	ĺ	0.35	5	x	0.8	╡ -		119.79	(79)
Southw	est <sub>0.9x</sub>	0.77	х	6.6	55	X	6	9.27	Ī	0.35	5	x	0.8	╡ -		89.37	(79)
Southw	est <sub>0.9x</sub>	0.77	X	6.6	55	X	4	4.07	ĺ	0.35	5	x	0.8			56.86	(79)
Southw	est <sub>0.9x</sub>	0.77	х	6.6	55	X	3	31.49	Ì	0.35	5	x	0.8	╗-		40.62	(79)
Solar g	ains in	watts, ca	alculated	I for eac	h month	า			(83)m	n = Sum(74	l)m(8	82)m					
(83)m=	69.14	117.77	161.14	199.66	223.63	2	22.01	214.04	196	.16 174.	.48 1	30.16	82.81	59.17			(83)
Total g	ains – i	nternal a	nd solar	(84)m =	= (73)m	+ (	83)m	, watts			·				_		
(84)m=	347	393.46	426.78	449.55	457.84	4	40.84	423.06	410	.43 396.	.95 3	868.55	339.4	329.26	;		(84)
7. Me	an inter	nal temp	erature	(heating	seasor	า)											
Temp	erature	during h	eating p	eriods ir	the liv	ing	area	from Tal	ole 9	, Th1 (°C	<b>c</b> )					21	(85)
Utilisa	ition fac	ctor for g	ains for l	iving are	ea, h1,n	n (s	ee Ta	ıble 9a)									_
	Jan	Feb	Mar	Apr	May		Jun	Jul	Α	ug Se	ер	Oct	Nov	Dec	:		
(86)m=	0.99	0.98	0.95	0.86	0.7		0.5	0.36	0.3	39 0.6	6	0.88	0.98	0.99			(86)
Mean	interna	l temper	ature in	living are	ea T1 (f	ollo	w ste	ps 3 to 7	7 in T	able 9c)							
(87)m=	20.46	20.59	20.76	20.91	20.98	T	21	21	2			20.91	20.66	20.43			(87)
Temp	erature	durina h	eating p	eriods ir	rest of	 f dw	/elling	from Ta	hle 9	<b>'</b> 9, Th2 (°	C)						
(88)m=	20.31	20.31	20.31	20.32	20.33	1	20.34	20.34	20.			20.33	20.32	20.32	7		(88)
Utilisa	ition fac	tor for g	ains for	rest of d	wellina.	h2	.m (se	ee Table	9a)	<u> </u>			•		_		
(89)m=	0.99	0.98	0.94	0.83	0.66	$\overline{}$	0.45	0.31	0.3	33 0.5	55	0.85	0.97	0.99			(89)
Moan	interna	l temper	ature in	the rest	of dwal	lina	T2 (f	ollow etc	ne 3	to 7 in T	Table !	0c)	_ <b>-</b>		_		
(90)m=	19.59	19.78	20.01	20.23	20.31	Ť	20.34	20.34	20.	1		20.23	19.9	19.56			(90)
( )···		L v						I		1 -3			ing area ÷ (4		╁	0.62	(91)
N 4	later:		a4	41	ا- مام	. [11] -	~\	. A <del>T</del> 4	. /4	£1 ^ \			•				<b></b> ` ′
	interna 20.13	l temper	ature (fo 20.47	r the wh	ole dwe	$\overline{}$	g) = f 20.75	20.75		– fLA) ×		20.65	20.37	20.4	٦		(92)
(92)m=									20.				20.37	20.1			(92)
Apply	aujusti	neni io ii	ie illean	ппетта	rempe	ıall	11 to 11 to	iii rable	4 <del>0</del> ,	where a	phinb	ııale					

THE RESIDUAL OF THE PARTY OF TH	20.14	20.32	20.5	20.58	20.6	20.6	20.6	20.59	20.5	20.22	19.95		(5
. Space hea				ra abtain	ad at at	on 11 of	Table 0	b 00 tb0	tTim /	76\m an	ط ده مماه	u loto	
Set Ti to the ne utilisation					ed at ste	ер 11 от	rable 9	o, so tna	t 11,m=(	76)m an	a re-caic	culate	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Jtilisation fac				Iviay	oun		_ /lug	_ оср		1404	_ D00		
)m= 0.99	0.97	0.94	0.84	0.67	0.47	0.33	0.35	0.57	0.86	0.97	0.99		(9
seful gains	l .	ļ			0	1 0.00	1 0.00	1 0.0.	0.00		0.00		•
)m= 343.32	383.4	400	377.71	308.26	208.46	139.21	145.68	226.16	316.57	330.18	326.68		(9
						139.21	143.00	220.10	310.37	330.10	320.00		
lonthly aver 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	1	(
										[	4.2		(
eat loss rat		1			_m , vv = 208.84	<del>- `                                   </del>	<del>-``</del>	<del>``</del>	350.81	400.04	505 57		- /-
)m= 570.56		499.72	412.4	314.49		139.23	145.72	227.65		468.04	565.57		(!
pace heatin	<del> </del>	1 1							<del></del>	r e	177.70	1	
)m= 169.07	113.7	74.19	24.98	4.64	0	0	0	0	25.48	99.25	177.73		_
							Tota	l per year	(kWh/yea	r) = Sum(9	8) <sub>15,912</sub> =	689.04	(!
pace heatin	ng require	ement in	kWh/m²	<sup>2</sup> /year								13.94	(
. Energy re	quiromor	ate — Indi	vidual b	oating ex	retome i	ncluding	micro-C	'UD\					_
		its – iriui	viduai Ti	calling sy	/Sterris II	ricidaling	i illicio-c	) II )					
pace heati raction of s	•	at from se	econdar	v/sunnle	mentarv	, evetem					ı	0	٦(
					incinary	•		(201)					╡
raction of sp	pace nea	at from m	iain syst	em(s)			(202) = 1					1	(;
raction of to	otal heati	ng from i	main sys	stem 1			(204) = (2	02) <b>x</b> [1 –	(203)] =			1	(2
fficiency of	main spa	ace heati	ng syste	em 1								90.3	7
													- 1 '
fficiency of	seconda	ry/supple	ementar	y heating	g system	ո, %						0	(2
		<del></del>					Διια	Son	Oct	Nov	Doc	-	
Jan	Feb	Mar	Apr	May	Jun	n, % Jul	Aug	Sep	Oct	Nov	Dec	0 kWh/yea	
Jan pace heatir	Feb ng require	Mar ement (c	Apr alculate	May d above)	Jun	Jul		· · · · · · · · · · · · · · · · · · ·	·	l	l	-	
Jan pace heatir	Feb ng require 113.7	Mar ement (c	Apr alculated 24.98	May d above)	Jun		Aug 0	Sep 0	Oct 25.48	Nov 99.25	Dec 177.73	-	ar
Jan  Space heatin  169.07  11)m = {[(98)	Feb ng require 113.7 3)m x (20	Mar ement (c 74.19 )4)] } x 1	Apr alculated 24.98 00 ÷ (20	May d above)	Jun	Jul		· · · · · · · · · · · · · · · · · · ·	25.48	99.25	177.73	-	⊒ î
Jan pace heatin	Feb ng require 113.7 3)m x (20	Mar ement (c	Apr alculated 24.98	May d above)	Jun	Jul	0	0	25.48	99.25	177.73	-	ar
Jan  pace heatir  169.07  11)m = {[(98)	Feb ng require 113.7 3)m x (20	Mar ement (c 74.19 )4)] } x 1	Apr alculated 24.98 00 ÷ (20	May d above) 4.64	Jun 0	Jul 0	0	0	25.48	99.25	177.73	-	ar (;
Jan space heatir 169.07 11)m = {[(98	Feb ng require 113.7 3)m x (20 125.91	Mar ement (c 74.19 )4)] } x 1 82.16	Apr alculated 24.98 00 ÷ (20 27.66	May d above) 4.64 06) 5.14	Jun 0	Jul 0	0	0	25.48	99.25	177.73	kWh/yea	ar (:
Jan  pace heatir  169.07  11)m = {[(98)  187.23	Feb 113.7 13.9m x (20 125.91 125.91	Mar ement (c 74.19 )4)] } x 1 82.16	Apr alculated 24.98 00 ÷ (20 27.66	May d above) 4.64 06) 5.14	Jun 0	Jul 0	0	0	25.48	99.25	177.73	kWh/yea	ar (:
Jan  pace heatir  169.07  11)m = {[(98) m x (20)]	Feb 113.7 13.9m x (20 125.91 125.91	Mar ement (c 74.19 )4)] } x 1 82.16	Apr alculated 24.98 00 ÷ (20 27.66	May d above) 4.64 06) 5.14	Jun 0	Jul 0	0	0	25.48	99.25	177.73	kWh/yea	ar (;
Jan  Space heatir  169.07  11)m = {[(98) m x (20)	Feb 113.7 125.91 125.91 12 125.91 125	Mar ement (c 74.19 ) } x 1 82.16 econdary 00 ÷ (20	Apr alculated 24.98 00 ÷ (20 27.66 y), kWh/ 8)	May d above) 4.64 06) 5.14 month	Jun 0 0	Jul 0	0 0 Total	0 0 I (kWh/yea	25.48 28.21 28.21 0	99.25	177.73	kWh/yea	ar (°
Jan  Space heatir  169.07  11)m = {[(98)  187.23  Space heatir  [[(98)m x (26)  5)m=  0	Feb 113.7 125.91 125.91 19 fuel (s 01)] } x 1	Mar ement (c 74.19 ) } x 1 82.16 econdary 00 ÷ (20	Apr alculated 24.98 00 ÷ (20 27.66 y), kWh/ 8)	May d above) 4.64 06) 5.14 month	Jun 0 0	Jul 0	0 0 Total	0 0 (kWh/yea	25.48 28.21 28.21 0	99.25	177.73	kWh/yea	ar ((
Jan  Space heatin  169.07  11)m = {[(98)  187.23  Space heatin ([(98)m x (20)  5)m= 0	Feb ng require 113.7  3)m x (20 125.91  ng fuel (s 01)] } x 1 0	Mar ement (c 74.19 )4)] } x 1 82.16 secondary 00 ÷ (20 0	Apr alculated 24.98 00 ÷ (20 27.66 y), kWh/ 8)	May d above) 4.64 06) 5.14 month	Jun 0 0	Jul 0	0 0 Total	0 0 (kWh/yea	25.48 28.21 28.21 0	99.25	177.73	kWh/yea	ar ((
Jan space heatin 169.07 11)m = {[(98) 187.23 space heatin ([(98)m x (20) 5)m= 0  atter heating utput from w	Feb ng require 113.7  3)m x (20 125.91  ng fuel (s 01)] } x 1 0  g vater hea	Mar ement (c 74.19 )4)] } x 1 82.16 secondary 00 ÷ (20 0	Apr alculated 24.98 00 ÷ (20 27.66 y), kWh/ 8)	May d above) 4.64 06) 5.14 month	Jun 0 0	0 0 0	0 0 Total	0 0 I (kWh/yea	25.48 28.21 28.21 0	99.25	177.73	kWh/yea	ar ((
Jan  Space heatin  169.07  11)m = {[(98)  187.23  Space heatin ([(98)m x (20)  5)m=  0  atter heatin utput from w  162.09	Feb required 113.7 shows a second of the sec	Mar ement (c 74.19 )4)] } x 1 82.16 secondary 00 ÷ (20 0 )	Apr alculated 24.98 00 ÷ (20 27.66 y), kWh/ 8) 0	May d above) 4.64 06) 5.14 month 0	Jun 0 0	Jul 0	0 Tota	0 0 (kWh/yea	25.48  28.21  ar) =Sum(2)  0  ar) =Sum(2)	99.25 109.92 211) <sub>15,101</sub> 0	177.73	763.06	ar (a
Jan space heatin 169.07 11)m = {[(98) 187.23 space heatin [((98)m x (20) 5)m= 0  ater heatin 162.09 ficiency of w	Feb ng require 113.7 3)m x (20 125.91 ng fuel (s 01)] } x 1 0  g vater hea 141.59	Mar ement (c 74.19 ) 34)] } x 1 82.16 secondary 00 ÷ (20 0 ) 0 ster (calculator)	Apr alculated 24.98 00 ÷ (20 27.66 y), kWh/ 8) 0	May d above) 4.64 06) 5.14 month 0 bove) 126.5	Jun 0 0 0 111.42	0 0 0 106.74	0 Tota 0 Tota 118.99	0 0 (kWh/yea 0 I (kWh/yea 120.31	25.48  28.21  ar) =Sum(2)  0  ar) =Sum(2)	99.25 109.92 211) <sub>15,101</sub> 0 215) <sub>15,101</sub>	177.73 196.82 = 0 = 158.28	kWh/yea	ar (a
Jan  pace heatin  169.07  11)m = {[(98)  187.23  pace heatin [(98)m x (20)  5)m= 0  ater heatin 162.09  ficiency of w 7)m= 85.5	Feb ng require 113.7  3)m x (20 125.91  ng fuel (s 01)] } x 1 0  g vater hea 141.59 vater hea 84.89	Mar ement (c 74.19 ) 4)] } x 1 82.16 secondary 00 ÷ (20 0 ) 4 147.31 ater 83.89	Apr alculated 24.98  00 ÷ (20 27.66  y), kWh/ 8)  0  ulated al 130.66	May d above) 4.64 06) 5.14 month 0	Jun 0 0	0 0 0	0 Tota	0 0 I (kWh/yea	25.48  28.21  ar) =Sum(2)  0  ar) =Sum(2)	99.25 109.92 211) <sub>15,101</sub> 0	177.73	763.06	ar (i
Jan  Space heatin  169.07  11)m = {[(98)	Feb ng require 113.7  B)m x (20 125.91  ng fuel (s 01)] } x 1  0  g vater hea 141.59 vater hea 84.89 heating,	Mar ement (c 74.19 ) 4)] } x 1 82.16 secondary 00 ÷ (20 0 147.31 ater 83.89 , kWh/mc	Apr alculated 24.98 00 ÷ (20 27.66  y), kWh/ 8) 0  ulated al 130.66  82.36  onth	May d above) 4.64 06) 5.14 month 0 bove) 126.5	Jun 0 0 0 111.42	0 0 0 106.74	0 Tota 0 Tota 118.99	0 0 (kWh/yea 0 I (kWh/yea 120.31	25.48  28.21  ar) =Sum(2)  0  ar) =Sum(2)	99.25 109.92 211) <sub>15,101</sub> 0 215) <sub>15,101</sub>	177.73 196.82 = 0 = 158.28	763.06	ar (i
Jan  pace heatin  169.07  11)m = {[(98)	Feb ng require 113.7  3)m x (20 125.91  ng fuel (s 01)] } x 1  0  g vater hea 141.59 vater hea 84.89 heating, )m x 100	Mar ement (c 74.19 04)] } x 1 82.16 econdary 00 ÷ (20 0  tter (calct 147.31 ater 83.89 , kWh/mc 0 ÷ (217)	Apr alculated 24.98 00 ÷ (20 27.66  y), kWh/8) 0  ulated al 130.66  82.36  onth m	May d above) 4.64 06) 5.14 month 0 bove) 126.5	Jun 0 0 0 111.42 81	Jul 0 0 0 106.74 81	0 Tota  0 Tota  118.99	0 0 0 (kWh/yea 120.31	25.48  28.21  ar) =Sum(2  0  ar) =Sum(2  137	99.25  109.92  211) <sub>15,101</sub> 0  215) <sub>15,101</sub> 146.24	177.73  196.82  0  158.28	763.06	ar (i
Jan  pace heatin  169.07  11)m = {[(98)	Feb ng require 113.7  B)m x (20 125.91  ng fuel (s 01)] } x 1  0  g vater hea 141.59 vater hea 84.89 heating,	Mar ement (c 74.19 ) 4)] } x 1 82.16 secondary 00 ÷ (20 0 147.31 ater 83.89 , kWh/mc	Apr alculated 24.98 00 ÷ (20 27.66  y), kWh/ 8) 0  ulated al 130.66  82.36  onth	May d above) 4.64 06) 5.14 month 0 bove) 126.5	Jun 0 0 0 111.42	0 0 0 106.74	0 Tota  118.99  81	0 0 0 1 (kWh/yea 120.31 81	25.48  28.21  ar) =Sum(2)  0  137  82.33	99.25 109.92 211) <sub>15,101</sub> 0 215) <sub>15,101</sub>	177.73 196.82 = 0 = 158.28	763.06 0	ar (a
Jan space heatin 169.07 111)m = {[(98) 187.23 space heatin [((98)m x (20) 5)m= 0  ater heatin struct from w 162.09 ficiency of w 7)m= 85.5 sel for water 19)m = (64) 9)m= 189.59	Feb ng require 113.7  3)m x (20 125.91  ng fuel (s 01)] } x 1  0  g vater hea 141.59 vater hea 84.89 heating, m x 100 166.78	Mar ement (c 74.19 04)] } x 1 82.16 econdary 00 ÷ (20 0  tter (calct 147.31 ater 83.89 , kWh/mc 0 ÷ (217)	Apr alculated 24.98 00 ÷ (20 27.66  y), kWh/8) 0  ulated al 130.66  82.36  onth m	May d above) 4.64 06) 5.14 month 0 bove) 126.5	Jun 0 0 0 111.42 81	Jul 0 0 0 106.74 81	0 Tota  118.99  81	0 0 0 (kWh/yea 120.31	25.48  28.21  28.21  0  137  82.33  166.4  19a) <sub>112</sub> =	99.25  109.92  211) <sub>15,101</sub> 0  215) <sub>15,101</sub> 146.24  84.52	177.73  196.82  0  158.28  85.67	763.06	(2) (2) (2) (2) (2) (2) (2) (3) (4) (4) (5) (5) (5) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7
Epace heating 169.07  11)m = {[(98) 187.23]  Epace heating ([(98)m x (20) 15)m= 0  ater heating utput from w 162.09  ficiency of w	Feb ng require 113.7  3)m x (20 125.91  ng fuel (s 01)] } x 1 0  g vater hea 141.59 vater hea 84.89 heating, m x 100 166.78	Mar ement (c 74.19 ) 4)] } x 1 82.16 secondary 00 ÷ (20 0 ) 4 (217) ater 83.89 , kWh/mc 0 ÷ (217) 175.59	Apr alculated 24.98  00 ÷ (20 27.66  y), kWh/8)  0  ulated al 130.66  82.36  onth m 158.64	May d above) 4.64 06) 5.14 month 0 00000 126.5	Jun 0 0 0 111.42 81	Jul 0 0 0 106.74 81	0 Tota  118.99  81	0 0 0 1 (kWh/yea 120.31 81	25.48  28.21  28.21  0  137  82.33  166.4  19a) <sub>112</sub> =	99.25  109.92  211) <sub>15,101</sub> 0  215) <sub>15,101</sub> 146.24	177.73  196.82  0  158.28  85.67	763.06 0	ar (i

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Water heating fuel used				1935.17	
Electricity for pumps, fans and electric keep-hot					_
mechanical ventilation - balanced, extract or pos	itive input from outside		120.66		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum of	(230a)(230g) =		150.66	(231)
Electricity for lighting				231.69	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =			3080.57	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	<b>Emission fac</b> kg CO2/kWh	ctor	Emissions kg CO2/yea	
Space heating (main system 1)			etor =		
Space heating (main system 1) Space heating (secondary)	kWh/year	kg CO2/kWh		kg CO2/yea	ar
	kWh/year	kg CO2/kWh	=	kg CO2/yea	ar ](261)
Space heating (secondary)	kWh/year (211) x (215) x	0.216 0.519 0.216	=	kg CO2/yea	ar (261) (263)
Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	0.216 0.519 0.216	=	kg CO2/yea 164.82 0 418	(261) (263) (264)
Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264)	kg CO2/kWh  0.216  0.519  0.216	= = =	kg CO2/yea 164.82 0 418 582.82	(261) (263) (264) (265)
Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264) (231) x	kg CO2/kWh  0.216  0.519  0.216  0.519	= = =	kg CO2/yea 164.82 0 418 582.82 78.19	(261) (263) (264) (265) (267)

El rating (section 14)

(274)

		User De	etails:						
Assessor Name:	Robyn Berry	5	Stroma	a Num	ber:		STRO	036659	
Software Name:	Stroma FSAP 2012	5	Softwa	re Vei	rsion:		Versio	n: 1.0.5.16	
	P	Property A	ddress:	G04 BF	P Finchle	ey Rd			
Address :	G04 BP Finchley Rd, Londo	on, NW3 5	ΣΕΥ						
1. Overall dwelling dime	nsions:								
One word floor		Area(				ight(m)	1,, ,	Volume(m³)	_
Ground floor		92	2.67	(1a) x	2	.54	(2a) =	235.38	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e)+(1ı	n) 92	2.67	(4)					
Dwelling volume				(3a)+(3b	)+(3c)+(3c	d)+(3e)+	.(3n) =	235.38	(5)
2. Ventilation rate:									
	main secondar heating heating	ry o	other		total			m³ per houi	•
Number of chimneys		+ [	0	= [	0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	Ī + 🗀	0	=	0	x 2	20 =	0	(6b)
Number of intermittent fa	ns			_ <u>_</u>	0	x ′	10 =	0	(7a)
Number of passive vents				Ī	0	x ′	10 =	0	(7b)
Number of flueless gas fi	res			Ī	0	X 4	40 =	0	(7c)
				_			'		_
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+(7a)$	7a)+(7b)+(7d	c) =		0		÷ (5) =	0	(8)
	een carried out or is intended, procee	ed to (17), ot	therwise c	ontinue fr	om (9) to (	(16)			_
Number of storeys in the	ne dwelling (ns)					[(0)	41-0-4	0	(9)
Additional infiltration	25 for steel or timber from a	r 0 25 for 1	maaanr	, constr	untion	[(9)-	-1]x0.1 =	0	(10)
	.25 for steel or timber frame or resent, use the value corresponding to			•	uction			0	(11)
deducting areas of openir		o uno grouto.		. (a					
If suspended wooden f	floor, enter 0.2 (unsealed) or 0	.1 (sealed	d), else	enter 0				0	(12)
If no draught lobby, en	•							0	(13)
-	s and doors draught stripped							0	(14)
Window infiltration			0.25 - [0.2	` '	-			0	(15)
Infiltration rate		•	, , ,	, , ,	2) + (13) -			0	(16)
•	q50, expressed in cubic metre	-	•	•	etre of e	envelope	area	3	(17)
•	ity value, then $(18) = [(17) \div 20] + ($				:- h-::			0.15	(18)
Number of sides sheltere	es if a pressurisation test has been don ad	ne or a degr	ee air per	теавшу	is being u	sea		3	(19)
Shelter factor	u .	(2	20) = 1 - [	0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporat	ing shelter factor	(2	21) = (18)	x (20) =				0.12	(21)
Infiltration rate modified for	_							0.12	<b>」</b> ` ′
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed 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 Faster (00s) (00	2)				•	-		•	
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		
(22a)m= 1.27 1.25	1.20 1.1 1.00 0.95	0.95	0.9∠	- 1	1.08	1.12	1.10		

0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14		
Calculate effe		-	rate for t	he appli	cable ca	se	!	<u> </u>	<u>!</u>	<u>!</u>	ļ	_	
If mechanic			l' N. (0		\ <b>-</b> /		NE\\	. (00)	) (OO )			0.5	(2
If exhaust air h									o) = (23a)			0.5	(2
If balanced with		-	-	_								76.5	(2
a) If balance						<del>- ` `                                 </del>	<del>-                                    </del>	ŕ	<del>- ^ `</del>	<del>-                                    </del>	<del>- ` ` </del>	) ÷ 100] 7	(5
24a)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		(2
b) If balance	1			1		<del> </del>	<del>- ^ ` ` </del>	<del>í `</del>	<del>- ` `</del>	<del>-                                    </del>	Ι ,	7	(C
24b)m= 0	0	0	0	0	0	0	0	0	0	0	0	_	(2
c) If whole h if (22b)r	nouse ext ກ < 0.5 ×			•	•				.5 × (23b	o)			
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		(2
Effective air	change	rate - er	nter (24a	) or (24h	o) or (24	c) or (24	ld) in bo	· (25)	•	•	•	_	
25)m= 0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25		(2
3. Heat losse	e and he	at lose r	naramet	or:								_	
LEMENT	Gros	S	Openin	ıgs	Net Ar		U-val		AXU		k-valu		ΑΧk
	area	(m²)	m	l <sup>2</sup>	A ,r	n²	W/m2	K .	(W/I	K)	kJ/m²•	K	kJ/K
Doors					2.1	X	1.2	=	2.52	_			(2
Vindows Type					3.576	<u>x</u> 1	/[1/( 0.9 )+	0.04] =	3.11				(2
Vindows Type	∍ 2				7.181	x1	/[1/( 0.9 )+	0.04] =	6.24				(2
Vindows Type	∍ 3				3.098	3 x1	/[1/( 0.9 )+	0.04] =	2.69				(2
Vindows Type	∍ 4				3.098	3 x1	/[1/( 0.9 )+	0.04] =	2.69				(2
Vindows Type	∍ 5				3.376	3 x1	/[1/( 0.9 )+	0.04] =	2.93				(2
Floor					92.66	8 x	0.1	=	9.2668				(2
	69.2	2	20.33	3	48.87	7 X	0.15	=	7.33				(2
Valls Type1						=				<b>—</b> i		$\neg   $	(2
• •	4.06	;	2.1		1.96	X	0.14	=	0.28				
Valls Type1 Valls Type2 Fotal area of e	4.06				1.96	=	0.14	=	0.28				(3
Valls Type2	4.06					2	0.14	=	0.28				(; (;
Valls Type2 otal area of e	4.06				165.9	2 3 x							(;
Valls Type2 Total area of e	4.06 elements,	, m² ows, use e	2.1		165.9 34.98 92.67	2 3 ×	0	=	0	as given in	n paragrapi	h 3.2	(;
Valls Type2  Total area of every wall  Party ceiling  for windows and  * include the area	4.06 elements,	, m² ows, use e sides of in	2.1		165.9 34.98 92.67	2 3 x 7 lated using	0	=   /[(1/U-valu	0	as given in	n paragrapi	h 3.2	`
Valls Type2  Total area of every wall  Party ceiling  for windows and * include the area  Tabric heat los	4.06 d roof windows on both ass, W/K =	, m²  ows, use e sides of in = S (A x	2.1		165.9 34.98 92.67	2 3 x 7 lated using	0 g formula 1	=   /[(1/U-valu ) + (32) =	0				(3
Valls Type2  Total area of every wall  Party ceiling  for windows and	4.06 d roof windows on both as, W/K = Cm = S(	, m²  ows, use e sides of in = S (A x A x k)	2.1  effective winternal walk U)	ls and pan	165.9 34.98 92.67 alue calcul titions	2 x 7 lated using	0 g formula 1	=   /[(1/U-valu ) + (32) = ((28).	0 ue)+0.04] a	2) + (32a)		37.05	
Valls Type2 Total area of earty wall Party ceiling for windows and * include the area Tabric heat los	4.06 d roof windo as on both ss, W/K = Cm = S(A) s parameter sments when	ows, use esides of ine S (A x A x k) ter (TMF	2.1  2.1  effective winternal walk U)  P = Cm ÷ tails of the	ls and pan	165.9 34.98 92.67 alue calcul titions	2 x 7 lated using	0 g formula 1 (26)(30)	=   /[(1/U-valu ) + (32) = ((28). Indica	0  ue)+0.04] a (30) + (32)  tive Value	2) + (32a) : Medium	(32e) =	37.05 14353.6	(()

Results and in	nputs into	ormed by	/ develo <sub>l</sub>	per decla	aration. I	Any devi	iation is (	certain to	o output	differen	t results.		
Total fabric he	at loss							(33) +	(36) =			41.27	(37)
Ventilation hea	at loss ca	alculated	l monthly	y				(38)m	= 0.33 × (	(25)m x (5)			_
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 20.64	20.41	20.19	19.06	18.83	17.7	17.7	17.48	18.16	18.83	19.29	19.74		(38)
Heat transfer	coefficie	nt, W/K						(39)m	= (37) + (	38)m	-		
(39)m= 61.91	61.69	61.46	60.33	60.1	58.98	58.98	58.75	59.43	60.1	60.56	61.01		
							•		_	Sum(39) <sub>1</sub>	12 /12=	60.27	(39)
Heat loss para	<del>- `</del>	<del>–</del>		1			1	` ′	= (39)m ÷	<del>`</del>		ı	
(40)m= 0.67	0.67	0.66	0.65	0.65	0.64	0.64	0.63	0.64	0.65	0.65	0.66	0.05	7(40)
Number of day	ys in mo	nth (Tab	le 1a)					,	Average =	Sum(40) <sub>1</sub>	12 /12=	0.65	(40)
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 hea	ting ene	rgy requi	irement:								kWh/ye	ear:	
Veerimed occi	upapay	NI									22	1	(40)
Assumed occu if TFA > 13.			[1 - exp	(-0.0003	349 x (TF	FA -13.9	)2)] + 0.0	0013 x (	ΓFA -13.		.66		(42)
if TFA £ 13.	9, N = 1											ı	
Annual averag									se target o		7.39		(43)
not more that 125	_				_	-	.0 40/11010	a water ac	o targot o	,			
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage	in litres per	r day for ea		Vd,m = fa	ctor from	Table 1c x	_			•		l	
(44)m= 107.13	103.23	99.33	95.44	91.54	87.65	87.65	91.54	95.44	99.33	103.23	107.13		
Energy content of	f hot water	used - cal	culated me	onthly = 4.	190 x Vd.r	n x nm x D	OTm / 3600			m(44) <sub>112</sub> =		1168.64	(44)
(45)m= 158.86	138.94	143.38	125	119.94	103.5	95.91	110.06	111.37	129.79	141.68	153.85		
(10)111= 100.00	1 100.01	1 10.00	120	110.01	100.0	00.01	110.00			m(45) <sub>112</sub> =		1532.28	(45)
If instantaneous v	vater heati	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46)						<b>_</b> ``
(46)m= 23.83	20.84	21.51	18.75	17.99	15.52	14.39	16.51	16.71	19.47	21.25	23.08		(46)
Water storage Storage volum		) includir	ng any se	olar or W	/WHRS	storage	within sa	me ves	sel		0		(47)
If community h	` '		•			_			301		0		(47)
Otherwise if n	•			_			. ,	ers) ente	er '0' in (	47)			
Water storage	loss:												
a) If manufac	turer's de	eclared I	oss facto	or is kno	wn (kWł	n/day):					0		(48)
Temperature f	factor fro	m Table	2b								0		(49)
Energy lost fro		-	-		. ,		(48) x (49)	=			0		(50)
b) If manufact Hot water stor			-								0		(51)
If community h	•			(////	, 0, 00	-1/					0		(01)
Volume factor	•										0		(52)
Temperature f	factor fro	m Table	2b								0		(53)
Energy lost fro		_	, kWh/ye	ear			(47) x (51)	x (52) x (	53) =		0		(54)
Enter (50) or	(54) in (5	55)									0		(55)

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Water storage	loss cal	culated f	for each	month			((56)m = (	55) × (41)r	m				
	0	0	0	0	0	0	0	0	0	0	0		(56)
(56)m= 0  If cylinder contain	_	·	·		_	_	·	·		_		ix H	(30)
(57)m= 0	0	0	0	0	0	0	0	0	0	0	0		(57)
	t loop (or	nual) fra	m Toble	. 2							0		(58)
Primary circui Primary circui	•	•			59)m = (	(58) ± 36	5 × (41)	m			U		(00)
(modified b				•	•	. ,	, ,		r thermo	stat)			
(59)m= 0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi loss ca	lculated	for each	month (	(61)m =	(60) ÷ 36	65 × (41)	)m						
(61)m= 50.96	46.03	50.62	47.07	46.65	43.22	44.66	46.65	47.07	50.62	49.32	50.96		(61)
Total heat red	uired for	water he	eating ca	alculated	for eacl	h month	(62)m =	0.85 × (	45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 209.82	184.97	194	172.07	166.59	146.72	140.57	156.7	158.44	180.41	190.99	204.81		(62)
Solar DHW input	calculated	using App	endix G or	Appendix	H (negati	ve quantity	/) (enter '0	if no sola	r contribut	ion to wate	er heating)	ı	
(add additiona	al lines if	FGHRS	and/or V	VWHRS	applies	, see Ap	pendix (	<del>3</del> )					
(63)m= 0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output from w	ater hea	ter	_		-	-				-	-		
(64)m= 209.82	184.97	194	172.07	166.59	146.72	140.57	156.7	158.44	180.41	190.99	204.81		_
		-	-	-	-	-	Outp	out from wa	ater heate	r (annual) <sub>1</sub>	12	2106.1	(64)
Heat gains fro	m water	heating,	kWh/mo	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)m	]	
(65)m= 65.56	57.71	60.33	53.33	51.54	45.00								(CE)
` '		00.55	55.55	51.54	45.22	43.06	48.26	48.8	55.81	59.44	63.9		(65)
include (57)	m in cal	ļ			ļ	ļ				ļ	ļ	eating	(65)
		culation o	of (65)m	only if c	ļ	ļ				ļ	ļ	eating	(65)
include (57)	ains (see	culation of Table 5	of (65)m and 5a	only if c	ļ	ļ				ļ	ļ	eating	(65)
include (57) 5. Internal g	ains (see	culation of Table 5	of (65)m and 5a	only if c	ļ	ļ				ļ	ļ	eating	(65)
include (57) 5. Internal g Metabolic gain	ains (see	culation of Table 5	of (65)m and 5a	only if c	ylinder i	s in the o	dwelling	or hot w	ater is fr	om com	munity h	eating	(66)
include (57) 5. Internal g Metabolic gain Jan	ains (see ns (Table Feb 133.03	culation of Table 5 (a) Wat Mar	of (65)m 5 and 5a ts Apr 133.03	only if controls:  May  133.03	Jun 133.03	Jul 133.03	Aug 133.03	Sep	ater is fr	om com	munity h	eating	
include (57) 5. Internal g Metabolic gain Jan (66)m= 133.03	ains (see ns (Table Feb 133.03	culation of Table 5 (a) Wat Mar	of (65)m 5 and 5a ts Apr 133.03	only if controls:  May  133.03	Jun 133.03	Jul 133.03	Aug 133.03	Sep	ater is fr	om com	munity h	eating	
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains	res (Table Feb 133.03 (calcula	Table 5 2 5), Wat Mar 133.03 ted in Ap	of (65)m and 5a ts Apr 133.03 ppendix 11.9	May 133.03 L, equati 8.89	Jun 133.03 ion L9 o	Jul 133.03 r L9a), a	Aug 133.03 Iso see	Sep 133.03 Table 5	Oct 133.03	Nov	Dec	eating	(66)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75	res (Table Feb 133.03 (calcula	Table 5 2 5), Wat Mar 133.03 ted in Ap	of (65)m and 5a ts Apr 133.03 ppendix 11.9	May 133.03 L, equati 8.89	Jun 133.03 ion L9 o	Jul 133.03 r L9a), a	Aug 133.03 Iso see	Sep 133.03 Table 5	Oct 133.03	Nov	Dec	eating	(66)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga	res (Table Feb 133.03 (calcula 19.32 tins (calcula 246.43	culation of Table 5 (a) Wat Mar 133.03 (b) 15.71 (c) culated in 240.05	of (65)m 5 and 5a ts Apr 133.03 opendix 11.9 Appendix 226.48	only if construction in the construction in th	Jun 133.03 ion L9 o 7.51 uation L 193.23	Jul 133.03 r L9a), a 8.11 13 or L1 182.47	Aug 133.03 Iso see 10.54 3a), also	Sep 133.03 Table 5 14.15 see Tal 186.31	Oct 133.03 17.97 ole 5	Nov 133.03	Dec 133.03	eating	(66) (67)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9	res (Table Feb 133.03 (calcula 19.32 tins (calcula 246.43	culation of Table 5 (a) Wat Mar 133.03 (b) 15.71 (c) culated in 240.05	of (65)m 5 and 5a ts Apr 133.03 opendix 11.9 Appendix 226.48	only if construction in the construction in th	Jun 133.03 ion L9 o 7.51 uation L 193.23	Jul 133.03 r L9a), a 8.11 13 or L1 182.47	Aug 133.03 Iso see 10.54 3a), also	Sep 133.03 Table 5 14.15 see Tal 186.31	Oct 133.03 17.97 ole 5	Nov 133.03	Dec 133.03	eating	(66) (67)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains	res (Table Feb 133.03 (calcula 19.32 tins (calcula 246.43 s (calcula 36.3	culation of Table 5 2 5), Wat Mar 133.03 ted in Ap 15.71 culated in 240.05 ated in A 36.3	of (65)m ts Apr 133.03 ppendix 11.9 Append 226.48 ppendix 36.3	May 133.03 L, equati 8.89 dix L, eq 209.34 L, equat	Jun 133.03 ion L9 or 7.51 uation L 193.23 ion L15	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a)	Aug 133.03 Iso see 10.54 3a), also 179.94	Sep 133.03 Table 5 14.15 see Tal ee Table	Oct 133.03  17.97  ole 5 199.89 5	Nov 133.03 20.97	Dec 133.03 22.36 233.14	eating	(66) (67) (68)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains  (69)m= 36.3	res (Table Feb 133.03 (calcula 19.32 tins (calcula 246.43 s (calcula 36.3	culation of Table 5 2 5), Wat Mar 133.03 ted in Ap 15.71 culated in 240.05 ated in A 36.3	of (65)m ts Apr 133.03 ppendix 11.9 Append 226.48 ppendix 36.3	May 133.03 L, equati 8.89 dix L, eq 209.34 L, equat	Jun 133.03 ion L9 or 7.51 uation L 193.23 ion L15	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a)	Aug 133.03 Iso see 10.54 3a), also 179.94	Sep 133.03 Table 5 14.15 see Tal ee Table	Oct 133.03  17.97  ole 5 199.89 5	Nov 133.03 20.97	Dec 133.03 22.36 233.14	eating	(66) (67) (68)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains  (69)m= 36.3  Pumps and fa	reb 133.03 (calcula 19.32 tins (calcula 246.43 s (calcula 36.3 ns gains 3	culation of the culation of th	of (65)m ts Apr 133.03 ppendix 11.9 Appendix 226.48 ppendix 36.3 5a) 3	only if constructions:  May  133.03  L, equations 8.89  dix L, equations 209.34  L, equations 36.3	Jun 133.03 ion L9 of 7.51 uation L 193.23 ion L15 36.3	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a) 36.3	Aug 133.03 Iso see 10.54 3a), also 179.94 , also se 36.3	Sep 133.03 Table 5 14.15 see Tal 186.31 ee Table 36.3	Oct 133.03 17.97 ole 5 199.89 5 36.3	Nov 133.03 20.97 217.03	Dec 133.03 22.36 233.14	eating	(66) (67) (68) (69)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains  (69)m= 36.3  Pumps and fa  (70)m= 3	res (Table Feb 133.03 (calcula 19.32 tins (calcula 36.3 res gains 3 vaporatio	culation of the culation of th	of (65)m ts Apr 133.03 ppendix 11.9 Appendix 226.48 ppendix 36.3 5a) 3	only if constructions:  May  133.03  L, equations 8.89  dix L, equations 209.34  L, equations 36.3	Jun 133.03 ion L9 of 7.51 uation L 193.23 ion L15 36.3	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a) 36.3	Aug 133.03 Iso see 10.54 3a), also 179.94 , also se 36.3	Sep 133.03 Table 5 14.15 see Tal 186.31 ee Table 36.3	Oct 133.03 17.97 ole 5 199.89 5 36.3	Nov 133.03 20.97 217.03	Dec 133.03 22.36 233.14	eating	(66) (67) (68) (69)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains  (69)m= 36.3  Pumps and fa  (70)m= 3  Losses e.g. e	res (Table Feb 133.03 (calcula 19.32 tins (calcula 36.3 ns gains 3 vaporatio 1-106.42	culation of the Europe Solution of the Europe	of (65)m ts Apr 133.03 ppendix 11.9 Appendix 226.48 ppendix 36.3 5a) 3 tive valu	only if construction is a second of the construction is a seco	Jun 133.03 ion L9 of 7.51 uation L 193.23 ion L15 36.3	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a) 36.3	Aug 133.03 Iso see 10.54 3a), also 179.94 , also se 36.3	Sep 133.03 Table 5 14.15 see Tal 186.31 ee Table 36.3	Oct 133.03  17.97  ole 5 199.89 5 36.3	Nov 133.03 20.97 217.03	Dec 133.03 22.36 233.14 36.3	eating	(66) (67) (68) (69) (70)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains (67)m= 21.75  Appliances ga (68)m= 243.9  Cooking gains (69)m= 36.3  Pumps and fa (70)m= 3  Losses e.g. et (71)m= -106.42	res (Table Feb 133.03 (calcula 19.32 tins (calcula 36.3 ns gains 3 vaporatio 1-106.42	culation of the Europe Solution of the Europe	of (65)m ts Apr 133.03 ppendix 11.9 Appendix 226.48 ppendix 36.3 5a) 3 tive valu	only if construction is a second of the construction is a seco	Jun 133.03 ion L9 o 7.51 uation L 193.23 ion L15 36.3	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a) 36.3	Aug 133.03 Iso see 10.54 3a), also 179.94 , also se 36.3	Sep 133.03 Table 5 14.15 see Tal 186.31 ee Table 36.3	Oct 133.03  17.97  ole 5 199.89 5 36.3	Nov 133.03 20.97 217.03	Dec 133.03 22.36 233.14 36.3	eating	(66) (67) (68) (69) (70)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains  (69)m= 36.3  Pumps and fa  (70)m= 3  Losses e.g. e  (71)m= -106.42  Water heating	res (Table Feb 133.03 (calcula 19.32 tins (calcula 36.3 rs gains 3 vaporatio gains (Table 85.87	culation of the Eulation of th	of (65)m ts Apr 133.03 ppendix 11.9 Appendix 226.48 ppendix 36.3 5a) 3 tive valu -106.42	only if construction only if c	Jun 133.03 ion L9 o 7.51 uation L 193.23 ion L15 36.3  3 le 5) -106.42	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a) 36.3	Aug 133.03 Iso see 10.54 3a), also 179.94 1, also se 36.3	Sep 133.03 Table 5 14.15 see Tal 186.31 ee Table 36.3	Oct 133.03 17.97 ole 5 199.89 5 36.3 3 -106.42	Nov 133.03 20.97 217.03 36.3 3	Dec 133.03 22.36 233.14 36.3 3	eating	(66) (67) (68) (69) (70) (71)
include (57)  5. Internal g  Metabolic gain  Jan  (66)m= 133.03  Lighting gains  (67)m= 21.75  Appliances ga  (68)m= 243.9  Cooking gains  (69)m= 36.3  Pumps and fa  (70)m= 3  Losses e.g. e  (71)m= -106.42  Water heating  (72)m= 88.12	ains (see response (Table Feb 133.03) (calcula 19.32) ains (calcula 246.43) a (calcula 36.3) as (calcula 36.3) as (pains gains 3) vaporation 106.42 a gains (Table Feb 133.03) a (calcula 36.3) b (calcula 36.3) a (calcula 36.3) b (calcula 36.3) a (calcula 36.3) b	culation of the Eulation of th	of (65)m ts Apr 133.03 ppendix 11.9 Appendix 226.48 ppendix 36.3 5a) 3 tive valu -106.42	only if construction only if c	Jun 133.03 ion L9 o 7.51 uation L 193.23 ion L15 36.3  3 le 5) -106.42	Jul 133.03 r L9a), a 8.11 13 or L1 182.47 or L15a) 36.3	Aug 133.03 Iso see 10.54 3a), also 179.94 1, also se 36.3	Sep 133.03 Table 5 14.15 see Tal 186.31 ee Table 36.3	Oct 133.03 17.97 ole 5 199.89 5 36.3 3 -106.42	Nov 133.03 20.97 217.03 36.3 3	Dec 133.03 22.36 233.14 36.3 3	eating	(66) (67) (68) (69) (70) (71)

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

Orientation:	Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
North 0.9	0.77	x	3.1	x	10.63	x	0.35	x	0.8	=	6.39	(74)
North 0.9	0.77	X	3.1	x	20.32	X	0.35	X	0.8	=	12.22	(74)
North 0.9	0.77	X	3.1	x	34.53	x	0.35	x	0.8	=	20.76	(74)
North 0.9	0.77	X	3.1	х	55.46	x	0.35	X	0.8	=	33.34	(74)
North 0.9	0.77	X	3.1	x	74.72	X	0.35	X	0.8	=	44.91	(74)
North 0.9	0.77	X	3.1	x	79.99	x	0.35	x	0.8	=	48.08	(74)
North 0.9	0.77	x	3.1	x	74.68	x	0.35	x	0.8	=	44.89	(74)
North 0.9	0.77	x	3.1	x	59.25	x	0.35	x	0.8	=	35.62	(74)
North 0.9	0.77	x	3.1	x	41.52	x	0.35	x	0.8	=	24.96	(74)
North 0.9	0.77	X	3.1	x	24.19	x	0.35	x	0.8	=	14.54	(74)
North 0.9	0.77	x	3.1	x	13.12	x	0.35	x	0.8	] =	7.89	(74)
North 0.9	0.77	x	3.1	x	8.86	x	0.35	x	0.8	=	5.33	(74)
South 0.9	0.77	X	3.1	x	46.75	x	0.35	x	0.8	] =	28.1	(78)
South 0.9	0.77	x	3.1	x	76.57	x	0.35	x	0.8	] =	46.03	(78)
South 0.9	0.77	X	3.1	x	97.53	x	0.35	x	0.8	=	58.63	(78)
South 0.9	0.77	x	3.1	x	110.23	x	0.35	x	0.8	] =	66.27	(78)
South 0.9	0.77	X	3.1	X	114.87	x	0.35	X	0.8	] =	69.05	(78)
South 0.9	0.77	X	3.1	x	110.55	x	0.35	x	0.8	] =	66.45	(78)
South 0.9	0.77	x	3.1	x	108.01	x	0.35	x	0.8	] =	64.93	(78)
South 0.9x	0.77	X	3.1	x	104.89	x	0.35	x	0.8	=	63.06	(78)
South 0.9x	0.77	x	3.1	x	101.89	x	0.35	x	0.8	=	61.25	(78)
South 0.9	0.77	x	3.1	x	82.59	x	0.35	x	0.8	] =	49.65	(78)
South 0.9	0.77	X	3.1	X	55.42	x	0.35	X	0.8	] =	33.31	(78)
South 0.9	0.77	X	3.1	X	40.4	x	0.35	X	0.8	=	24.28	(78)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	36.79		0.35	X	0.8	=	25.53	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	62.67		0.35	X	0.8	=	43.49	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	85.75		0.35	X	0.8	=	59.5	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	x	106.25		0.35	X	0.8	=	73.73	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	119.01		0.35	X	0.8	=	82.58	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	x	118.15		0.35	X	0.8	=	81.98	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	113.91		0.35	X	0.8	=	79.04	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	104.39		0.35	X	0.8	=	72.44	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	92.85		0.35	X	0.8	=	64.43	(79)
Southwest <sub>0.9</sub>	0.77	X	3.58	X	69.27		0.35	X	0.8	=	48.06	(79)
Southwest <sub>0.9</sub>		X	3.58	x	44.07		0.35	x	0.8	=	30.58	(79)
Southwest <sub>0.9</sub>	0.77	x	3.58	x	31.49		0.35	x	0.8	=	21.85	(79)
West 0.9x	0.77	x	7.18	x	19.64	x	0.35	x	0.8	=	27.37	(80)
West 0.9	0.77	X	7.18	x	38.42	x	0.35	x	0.8	=	53.54	(80)
West 0.9x	0.77	x	7.18	X	63.27	X	0.35	X	0.8	=	88.16	(80)

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

	,		,										
West 0.9x	0.77	X	7.18	3	x	92.28	X	0.35	X	0.8	=	128.58	(80)
West 0.9x	0.77	X	7.18	В	x	113.09	x	0.35	X	0.8	=	157.58	(80)
West 0.9x	0.77	X	7.18	3	x	115.77	X	0.35	X	0.8	=	161.31	(80)
West 0.9x	0.77	X	7.18	3	x	110.22	x	0.35	X	0.8	=	153.58	(80)
West 0.9x	0.77	X	7.18	В	x	94.68	x	0.35	x	0.8	=	131.92	(80)
West 0.9x	0.77	x	7.18	3	x	73.59	x	0.35	X	0.8	=	102.54	(80)
West 0.9x	0.77	X	7.18	3	x	45.59	x	0.35	X	0.8	=	63.52	(80)
West 0.9x	0.77	X	7.18	В	x	24.49	x	0.35	X	0.8	=	34.12	(80)
West 0.9x	0.77	X	7.18	3	x	16.15	x	0.35	X	0.8	=	22.51	(80)
Northwest 0.9x	0.77	X	3.38	3	x	11.28	X	0.35	X	0.8		7.39	(81)
Northwest 0.9x	0.77	X	3.38	3	x	22.97	x	0.35	X	0.8	=	15.05	(81)
Northwest <sub>0.9x</sub>	0.77	X	3.38	3	x	41.38	x	0.35	x	0.8	=	27.11	(81)
Northwest 0.9x	0.77	x	3.38	3	x	67.96	x	0.35	X	0.8	=	44.52	(81)
Northwest 0.9x	0.77	x	3.38	3	x	91.35	X	0.35	x	0.8	=	59.84	(81)
Northwest 0.9x	0.77	x	3.38	3	x	97.38	x	0.35	X	0.8	=	63.79	(81)
Northwest 0.9x	0.77	x	3.38	3	x	91.1	X	0.35	X	0.8	=	59.68	(81)
Northwest 0.9x	0.77	x	3.38	3	x	72.63	x	0.35	x	0.8	=	47.58	(81)
Northwest 0.9x	0.77	X	3.38	3	x	50.42	x	0.35	X	0.8	=	33.03	(81)
Northwest <sub>0.9x</sub>	0.77	X	3.38	В	x	28.07	x	0.35	x	0.8	=	18.39	(81)
Northwest <sub>0.9x</sub>	0.77	X	3.38	3	x	14.2	x	0.35	X	0.8	=	9.3	(81)
Northwest 0.9x	0.77	X	3.38	3	x	9.21	x	0.35	X	0.8	=	6.04	(81)
Solar gains in	watts, calc	ulated	for each	month			(83)m	n = Sum(74)m .	(82)m				
(83)m= 94.79		254.16		413.97		21.63 402.12	350	0.6 286.2	194.1	115.2	80		(83)
Total gains – i			<del>`                                    </del>	, ,	È	<del></del>					i	ı	
(84)m= 514.47	587.84 6	556.92	724.78	767.38	7	51.08 716.47	671	.85 620.35	552.9	501.66	487.29		(84)
7. Mean inte	rnal temper	ature (	(heating s	season	)								
Temperature	during hea	ating p	eriods in	the livir	ng	area from Tal	ole 9	, Th1 (°C)				21	(85)
Utilisation fac	ctor for gair	ns for l	iving area	a, h1,m	(s	ee Table 9a)		•				i	
Jan	Feb	Mar	Apr	May		Jun Jul	Α	ug Sep	Oct	Nov	Dec		
(86)m= 1	0.99	0.98	0.89	0.71		0.5 0.36	0.4	4 0.65	0.94	0.99	1		(86)
Mean_interna	al temperati	ure in I	iving area	a T1 (fc	ollo	w steps 3 to 7	in T	able 9c)					
(87)m= 20.42	20.55	20.72	20.91	20.99		21 21	2	1 20.99	20.88	20.62	20.4		(87)
Temperature	during hea	ating p	eriods in	rest of	dw	elling from Ta	able 9	9, Th2 (°C)					
(88)m= 20.37	20.37	20.37	20.38	20.39	2	20.4 20.4	20	.4 20.39	20.39	20.38	20.38		(88)
Utilisation fac	ctor for gair	ns for r	est of dw	ellina. I	h2.	m (see Table	9a)			•		•	
(89)m= 1	<del></del> -	0.97	0.87	0.67		0.45 0.31	0.3	35 0.6	0.92	0.99	1		(89)
Mean interna	al temperati	ure in t	he rest o	f dwelli	na na	T2 (follow ste	ne a	to 7 in Tahl	e 9c)			1	
(90)m= 19.59	<del></del>	20.02	20.28	20.37	Ť	20.4 20.4	20		20.25	19.88	19.56		(90)
(, -	1 1 -		- :		_	1				ring area ÷ (4		0.38	(91)
												1 3.00	<b></b> ` ′

Mean internal temperature (for the whole dwelling) =  $fLA \times T1 + (1 - fLA) \times T2$ 

92)m= 19.91		20.29	20.52	20.61	20.63	20.63	20.63	20.62	20.49	20.16	19.88		(92
Apply adjus		r				i e	4e, whe	ere appro	priate	1			
3)m= 19.76	19.92	20.14	20.37	20.46	20.48	20.48	20.48	20.47	20.34	20.01	19.73		(93
B. Space he	ating requ	uirement											
Set Ti to the			•		ed at ste	ep 11 of	Table 9	o, so tha	t Ti,m=(	76)m an	d re-calc	ulate	
the utilisatio	1				lun	11	۸۰۰۰	Con	Oct	Nov	Doo		
Jan Utilisation fo		Mar Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Jtilisation fa	0.99	0.97	0.87	0.68	0.46	0.32	0.36	0.61	0.91	0.99	1		(94
Jseful gain:					0.40	0.32	0.50	0.01	0.91	0.99	_ ' _		(0
5)m= 512.73	_	634.06	629.58	518.55	346.39	228.77	239.7	376.1	505.6	496.61	486.16		(9:
Monthly ave						220.77	200.7	070.1	000.0	400.01	400.10		(0
6)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		(9
Heat loss ra	J.									7.1	7.2		(0.
7)m= 956.90	1	838.33	692.15	526.51	346.7	228.78	239.73	378.68	585.69	782.06	947.73		(97
Space heat											347.70		(0)
8)m= 330.5	<del> </del>	151.98	45.05	5.92	0	0.02	0	0	59.59	205.53	343.41		
0)111= 000.0	201.07	101.00	40.00	0.02	· ·						<u> </u>	1272.26	(98
							Tula	l per year	(KVVII/yeai	) = Sum(9	0)15,912 =	1373.36	╡`
Space heat	ng require	ement in	kWh/m <sup>2</sup>	/year								14.82	(99
a. Energy re	equiremer	ıts – Indi	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space heat	ing:										_		_
•	•	t from se	econdary	//supple	mentary	system					[	0	(2
raction of	space hea		_		mentary	•	(202) = 1 -	- (201) =			[	0	╡`
raction of s raction of	space hea	t from m	ain syst	em(s)	mentary			- (201) = 02) × [1 -	(203)] =		[ ] ]		(20
Fraction of s Fraction of s Fraction of t	space hea space hea otal heati	it from m	ain syst	em(s) stem 1	mentary				(203)] =		[ [ [	1	(20
Fraction of s Fraction of s Fraction of s Efficiency o	space heaspace heaspace heasting of the space heat of the space heat in the space he	t from m ng from r ace heati	ain systemain system	em(s) stem 1 em 1		·			(203)] =		[	1 1 90.3	(20)
Fraction of straction of straction of straction of straction of straction of straction or stract	space heaspace heaspace heaspace heaspace in the space of	nt from m ng from r ace heati ry/supple	nain systemain systemain systementary	em(s) stem 1 em 1 y heating		າ, %	(204) = (204)	02) × [1 –				1 1 90.3 0	(2)
Fraction of straction pace hea space hea otal heatin f main spa f seconda	nt from m ng from r ace heati ry/supple Mar	ain systemain systemain systementary	em(s) stem 1 em 1 y heating	g system Jun	·			(203)] =	Nov	Dec	1 1 90.3	(2)	
Fraction of straction pace hea space hea otal heatil f main spa f seconda Feb ng require	nt from m ng from r ace heati ry/supple Mar ement (ca	nain systemain systemain systementary Apr alculated	em(s) stem 1 em 1 y heating May d above	g system Jun	n, %	(204) = (2 <sup>1</sup> )	02) × [1 -	Oct			1 1 90.3 0	(20)	
Fraction of straction pace hea space hea otal heatil f main spa f seconda Feb ng require	nt from m ng from r ace heati ry/supple Mar	ain systemain systemain systementary	em(s) stem 1 em 1 y heating	g system Jun	າ, %	(204) = (204)	02) × [1 –		Nov 205.53	Dec 343.41	1 1 90.3 0	(2)	
Fraction of straction pace hea space hea otal heating f main space f seconda Feb ng require 231.37	nt from ming from race heating ry/supplement (co	main systemain systemain systemantary Apr Alculated	em(s) stem 1 em 1 y heating May d above;	g system Jun	n, %	(204) = (2 <sup>1</sup> )	02) × [1 -	Oct			1 1 90.3 0	(20 (20 (20 (20 ear	
Fraction of straction pace hea space hea otal heatin f main spa f seconda Feb ng require 231.37	nt from ming from race heating ry/supplement (co	main systemain systemain systemantary Apr Alculated	em(s) stem 1 em 1 y heating May d above;	g system Jun	n, %	Aug 0	02) × [1 -	Oct 59.59	205.53	343.41	1 1 90.3 0	(20 (20 (20 (20 ear	
Fraction of straction pace hea space hea otal heatin f main spa f seconda Feb ng require 231.37	nt from ming from race heating ry/supplement (co. 151.98	main systemain systemain systementary Apr Alculated 45.05 00 ÷ (20	em(s) stem 1 em 1 y heating May d above 5.92	g system  Jun  0	n, % Jul 0	Aug 0	02) × [1 -	Oct 59.59	205.53	343.41	1 1 90.3 0	(20) (20) (20) (20) ear	
Fraction of straction pace hear space hear otal heating from space from spac	t from ming from race heating supplement (constant)   151.98   4)] } x 1	ain systemain systemain systemantary Apr Alculated 45.05 00 ÷ (20 49.89	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56	g system  Jun  0	n, % Jul 0	Aug 0	02) × [1 -	Oct 59.59	205.53	343.41	1 90.3 0 kWh/ye	(20) (20) (20) (20) ear	
Fraction of straction pace hear space hear	t from mag from race heating from Mar Mar 151.98 4)] } x 1 168.3	ain systemain systemain systematary Apr alculated 45.05 00 ÷ (20 49.89	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56	g system  Jun  0	n, % Jul 0	Aug 0	02) × [1 -	Oct 59.59	205.53	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) ear	
Fraction of straction pace hear space hear	t from mag from race heating from Mar Mar 151.98 4)] } x 1 168.3	ain systemain systemain systematary Apr alculated 45.05 00 ÷ (20 49.89	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56	g system  Jun  0	n, % Jul 0	Aug 0	02) × [1 -	Oct 59.59	205.53	343.41	1 90.3 0 kWh/ye	(20) (20) (20) (20) ear	
Fraction of straction pace headspace	t from ming from race heating mar lement (content for 151.98 lement leme	main systemain systemain systemantary Apr Alculated 45.05 00 ÷ (20 49.89	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56	g system  Jun  0	n, %  Jul  0	(204) = (204)	02) × [1 -	Oct 59.59 65.99 ar) =Sum(2	205.53 227.61 211) <sub>15,1012</sub>	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of straction pace headspace	t from ming from race heating mar lement (content for 151.98 lement leme	main systemain systemain systemantary Apr Alculated 45.05 00 ÷ (20 49.89	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56	g system  Jun  0	n, %  Jul  0	(204) = (204)	02) × [1 -   Sep  0  0  I (kWh/yea	Oct 59.59 65.99 ar) =Sum(2	205.53 227.61 211) <sub>15,1012</sub>	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of straction pace hear space hear	t from many from race heating from race heating from race heating from the front front from the front front from the front from the front from the front from the front front from the front front from the front fro	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month	g system  Jun  0	n, %  Jul  0	(204) = (204)	02) × [1 -   Sep  0  0  I (kWh/yea	Oct 59.59 65.99 ar) =Sum(2	205.53 227.61 211) <sub>15,1012</sub>	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of straction pace hear space hear otal heating from space hear otal heating from space from secondar February (201, 231, 37	t from many from race heating from race heating from race heating from the front front from the front front from the front from the front from the front from the front front from the front front from the front fro	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month	g system  Jun  0	n, %  Jul  0	(204) = (204)	02) × [1 -   Sep  0  0  I (kWh/yea	Oct 59.59 65.99 ar) =Sum(2	205.53 227.61 211) <sub>15,1012</sub>	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of straction pace hear space hear	t from many from race heating from race heating ry/supplement (calculate from 151.98 and 168.3 a	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month 0	g system  Jun  0	o 0	(204) = (204)	O2) × [1 -   Sep  0  0 I (kWh/yea	Oct 59.59 65.99 ar) =Sum(2	205.53 227.61 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of struction pace hear space hear	t from many from race heating from race heating from race heating from race heating from from from from from from from from	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month 0	g system  Jun  0	o 0	(204) = (204)	O2) × [1 -   Sep  0  0 I (kWh/yea	Oct 59.59 65.99 ar) =Sum(2 0 ar) =Sum(2	205.53 227.61 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	343.41	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of struction pace hears space	t from many from race heating from race heating ry/supplement (calculate from from from from from from from from	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month 0	g system  Jun  0  0  146.72	o 0 0 140.57	(204) = (204)	02) × [1 -   Sep  0  0  I (kWh/yea  158.44	Oct 59.59 65.99 ar) =Sum(2	205.53  227.61  211) <sub>15,1012</sub> 0  215) <sub>15,1012</sub>	343.41  380.3  0  204.81	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2)	
Fraction of struction pace hear space hear	t from many from race heating from race heating from race heating from race heating from from from from from from from from	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month 0	g system  Jun  0  0  146.72	o 0 0 140.57	(204) = (204)	02) × [1 -   Sep  0  0  I (kWh/yea  158.44	Oct 59.59 65.99 ar) =Sum(2 0 ar) =Sum(2	205.53  227.61  211) <sub>15,1012</sub> 0  215) <sub>15,1012</sub>	343.41  380.3  0  204.81	1 90.3 0 kWh/ye	(2) (2) (2) (2) (2) (2) (2) (2)	
Space heat  330.5  211)m = {[(9] 366.0  Space heat {[(98)m x (3) 215)m= 0  Vater heatin Dutput from 209.8  Efficiency of	space hear space hear	t from many from race heating from race heating from race heating from race heating from from from from from from from from	ain systemain sy	em(s) stem 1 em 1 y heating May d above 5.92 6) 6.56 month 0	g system  Jun  0  0  146.72	o 0 0 140.57	(204) = (204)	02) × [1 -   Sep  0  0  I (kWh/yea  158.44	Oct 59.59 65.99 ar) =Sum(2 0 ar) =Sum(2	205.53  227.61  211) <sub>15,1012</sub> 0  215) <sub>15,1012</sub>	343.41  380.3  0  204.81	1 90.3 0 kWh/ye	(20) (20) (20) (21) (21) (21) (21)

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

		,	
Annual totals		kWh/year	kWh/year
Space heating fuel used, main system 1			1520.88
Water heating fuel used			2520.03
Electricity for pumps, fans and electric keep-hot			
mechanical ventilation - balanced, extract or pos	itive input from outside		226.14 (230a)
central heating pump:			30 (230c)
Total electricity for the above, kWh/year	sum of	f (230a)(230g) =	256.14 (231)
Electricity for lighting			384.17 (232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =		4681.23 (338)
12a. CO2 emissions – Individual heating system	s including micro-CHP		
	The state of the s		
J - 7	Fnergy	Emission facto	or Fmissions
	<b>Energy</b> kWh/year	<b>Emission facto</b> kg CO2/kWh	or Emissions kg CO2/year
Space heating (main system 1)	0,	kg CO2/kWh	
	kWh/year	kg CO2/kWh	kg CO2/year
Space heating (main system 1)	kWh/year	kg CO2/kWh  0.216  0.519	kg CO2/year = 328.51 (261)
Space heating (main system 1) Space heating (secondary)	kWh/year (211) x (215) x	0.216 0.519 0.216	kg CO2/year = 328.51 (261) = 0 (263)
Space heating (main system 1) Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	kg CO2/kWh  0.216  0.519  0.216	kg CO2/year = 328.51 (261) = 0 (263) = 544.33 (264)
Space heating (main system 1) Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (263)	kg CO2/kWh  0.216  0.519  0.216  0.519	kg CO2/year  = 328.51 (261)  = 0 (263)  = 544.33 (264)  872.84 (265)
Space heating (main system 1) Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year  (211) x  (215) x  (219) x  (261) + (262) + (263) + (263) (261) x	kg CO2/kWh  0.216  0.519  0.216  64) =	kg CO2/year  = 328.51 (261)  = 0 (263)  = 544.33 (264)  872.84 (265)  = 132.94 (267)

El rating (section 14)

(274)

## **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.16 Printed on 03 August 2022 at 12:20:04

Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 89.7m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: 306 BP Finchley Rd

Address: 306 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.41 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 13.15 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 43.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 32.8 kWh/m²

OK
2 Fabric U-values

Element Average Highest

External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK
Party wall 0.00 (max. 0.20) - OK
Floor (no floor)

Roof 0.12 (max. 0.20) 0.12 (max. 0.35)

Openings 0.94 (max. 2.00) 1.20 (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 3.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

OK

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

6 Controls			
Space heating controls  Hot water controls:	TTZC by plumbing and e No cylinder thermostat No cylinder	electrical services	ОК
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights with Minimum	n low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract Specific fan power: Maximum MVHR efficiency: Minimum	ct system	0.63 1.5 90% 70%	ок ок
9 Summertime temperature			
Overheating risk (Thames va Based on: Overshading: Windows facing: North Windows facing: East Ventilation rate: Blinds/curtains:	ley):	Slight  Average or unknown 10.44m² 1.53m² 2.00 None	ОК
Air permeablility Windows U-value Roofs U-value Party Walls U-value		3.0 m³/m²h 0.9 W/m²K 0.12 W/m²K 0 W/m²K	

		. Here D	a ta Ha						
		User D	etails:						
Assessor Name:	Robyn Berry		Stroma	a Num	ber:		STRO	036659	
Software Name:	Stroma FSAP 2012		Softwa	re Vei	rsion:		Versio	n: 1.0.5.16	
	F	Property A	Address:	103 BF	Pinchle	y Rd			
Address :	103 BP Finchley Rd, Londo	n, NW3 5	5EY						
1. Overall dwelling dime	nsions:								
		Area	a(m²)		Av. He	ight(m)	, ,	Volume(m³)	_
Ground floor		4	19.6	(1a) x	2	.54	(2a) =	125.98	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 4	19.6	(4)					
Dwelling volume				(3a)+(3b)	)+(3c)+(3c	d)+(3e)+	.(3n) =	125.98	(5)
2. Ventilation rate:									
	main seconda heating heating	ry	other		total			m³ per hou	r
Number of chimneys		+	0	= [	0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	<b>-</b> + -	0	Ī = [	0	x	20 =	0	(6b)
Number of intermittent fa	ns			, <u> </u>	0	x -	10 =	0	(7a)
Number of passive vents				Ē	0	x '	10 =	0	(7b)
Number of flueless gas fi	res			F	0	X 4	40 =	0	(7c)
				_					
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = (6a)+(6b)+(	7a)+(7b)+(7	7c) =	Г	0		÷ (5) =	0	(8)
If a pressurisation test has b	een carried out or is intended, procee	ed to (17), c	otherwise o	ontinue fr	om (9) to	(16)			
Number of storeys in the	ne dwelling (ns)							0	(9)
Additional infiltration						[(9)	-1]x0.1 =	0	(10)
	.25 for steel or timber frame o			•	uction			0	(11)
if both types of wall are pa deducting areas of openir	resent, use the value corresponding t	o the greate	er wall are	a (after					
•	floor, enter 0.2 (unsealed) or 0	).1 (seale	d), else	enter 0				0	(12)
If no draught lobby, en	,	`	,,					0	(13)
•	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	12) + (13)	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cubic metro	es per ho	ur per so	quare m	etre of e	envelope	area	3	(17)
If based on air permeabil	ity value, then $(18) = [(17) \div 20] + (18)$	(8), otherwi	se (18) = (	16)				0.15	(18)
Air permeability value applie	es if a pressurisation test has been do	ne or a deg	gree air pei	meability	is being u	sed	'		
Number of sides sheltere	:d		(20)					3	(19)
Shelter factor			(20) = 1 -		[9)] =			0.78	(20)
Infiltration rate incorporat	_		(21) = (18)	x (20) =				0.12	(21)
Infiltration rate modified f	<del></del>		i					1	
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed 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 = (22	2\m ÷ 4								
	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
,				-	L	L <u>-</u>		I	

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

0.15 0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1	
<i>Calcul<mark>ate effective air d</mark></i> If mechanical ventilat	-	ate for t	he appli	cable ca	se	!		<u>.</u>	!	!	'	<b>—</b> ,,
If exhaust air heat pump u		endix N (2	3b) = (23a	ı) × Fmv (e	equation (N	NS)) other	wise (23h	) = (23a)			0.5	
If balanced with heat recov	0		, ,	,	. `	,, .	`	) — ( <b>20</b> 0)			76.5	
a) If balanced mecha	•	-	_					2h)m + (	23h) <b>x</b> [	1 <i>– (2</i> 3c)		(^2
24a)m= 0.27 0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	]	(2
b) If balanced mecha	nical ve	ntilation	without	heat rec	covery (N	иV) (24b	)m = (22	2b)m + (2	23b)	•	ı	
24b)m= 0 0	0	0	0	0	0	0	0	0	0	0	]	(2
c) If whole house ext	ract ven	tilation o	r positiv	e input v	entilatio	n from c	utside				•	
if (22b)m < 0.5 ×	(23b), tl	nen (24	c) = (23b	); other	vise (24	c) = (22b	) m + 0.	5 × (23b	)		,	
4c)m= 0 0	0	0	0	0	0	0	0	0	0	0	]	(
d) If natural ventilatio								0.51				
if $(22b)m = 1$ , the	0	$\frac{11 = (221)}{0}$	0	0	4u)III = 0	0.5 + [(2.	0	0.5]	0	0	1	(
Effective air change i			-								l	`
5)m= 0.27 0.26	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	1	(
											ı	
B. Heat losses and hea	•			Not Ar		Haralı	10	A V I I		le volue	·	V I
LEMENT Gros: area (	_	Openin m		Net Ar A ,r		U-valı W/m2		A X U (W/I	K)	k-value kJ/m²-l		X k J/K
oors				2.1	х	1.2	=	2.52				(
indows Type 1				6.649	x1.	/[1/( 0.9 )+	0.04] =	5.78				(
indows Type 2				3.035	x1.	/[1/( 0.9 )+	0.04] =	2.64				(
alls Type1 27.26	3	9.68		17.58	x	0.15	=	2.64	<del>-</del> [			
/alls Type2 20.05	5	2.1		17.95	, x	0.14	=	2.54	<b>=</b> [		$\exists$	<u> </u>
otal area of elements,	m²			47.31								(
arty wall				29.85	, x	0	=	0	$\neg$			
arty floor				49.6							$\exists$	
arty ceiling				49.6					Ī		7 =	<u> </u>
or windows and roof windo					ated using	formula 1	/[(1/U-valu	ie)+0.04] a	as given in	paragraph	1 3.2	
include the areas on both s			s and part	titions		(26)(30)	± (32) =					<u> </u>
abric heat loss, W/K = eat capacity Cm = S(A		0)				(20)(30)		.(30) + (32	2) + (32a)	(326) -	16.11	=
nermal mass paramet	•	) – Cm ÷	- TFΔ\ in	k I/m²K				tive Value		(326) =	6947.17	
or design assessments whe	•		,			ecisely the				able 1f	250	(
n be used instead of a deta					·							
nermal bridges : S (L :	x Y) cald	culated (	using Ap	pendix ł	<						4.97	(
details of thermal bridging a otal fabric heat loss	are not kno	own (36) =	= 0.05 x (3	1)			(33) +	(36) =			04.00	<u> </u>
entilation heat loss ca	lculated	monthly	,					(30) = = 0.33 × (	25)m x (5)	)	21.08	
	10010100		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	]	
	Mar I	ADI				9	, July			1 200	1	
Jan Feb 11.05 10.93	Mar 10.81	Apr 10.2	10.08	9.48	9.48	9.36	9.72	10.08	10.32	10.56	1	(
Jan Feb	10.81				9.48	9.36		10.08	<u> </u>	10.56	1	(

eat lo	ss para	meter (F	HLP), W/	m²K					(40)m	= (39)m ÷	- (4)			
0)m=	0.65	0.65	0.64	0.63	0.63	0.62	0.62	0.61	0.62	0.63	0.63	0.64		_
			. 41- /T-1-1	la 4 a\					,	Average =	Sum(40) <sub>1</sub>	12 /12=	0.63	(4
umbe 	ı i	Feb	nth (Tab		Mov	lun	Jul	۸۰۰۰	Con	Oct	Nov	Dec		
1)m=	Jan 31	28	Mar 31	Apr 30	May 31	Jun 30	31	Aug 31	Sep 30	Oct 31	Nov 30	31		(-
,	01		01	- 00	<u> </u>		0.	<u> </u>	00	01				`
1 \//2	tor hoat	ing ener	gy requi	rement:								kWh/ye	var:	
r. vva	ilei neal	ing ener	gy requi	rement.								KVVII/ye	<i>.</i>	
if TF.				[1 - exp	(-0.0003	349 x (TF	FA -13.9	)2)] + 0.0	0013 x (	ΓFA -13		68		(
		•	iter usag	ge in litre	s per da	ay Vd,av	erage =	(25 x N)	+ 36		74	.06		(
duce	the annua	l average	hot water	usage by	5% if the a	lwelling is	designed t	to achieve		se target o				
l more I						hot and co					·			
nt wate	Jan ar usaga ir	Feb	Mar day for ea	Apr	May	Jun ctor from 7	Jul	Aug	Sep	Oct	Nov	Dec		
ı									70.50	75.54	70.5	04.47		
l)m=	81.47	78.5	75.54	72.58	69.62	66.65	66.65	69.62	72.58	75.54	78.5 m(44) <sub>112</sub> =	81.47	888.72	
ergy c	content of	hot water	used - cal	culated mo	onthly $= 4$ .	190 x Vd,r	n x nm x C	OTm / 3600			. ,	L	000.72	
5)m=	120.81	105.66	109.03	95.06	91.21	78.71	72.93	83.69	84.69	98.7	107.74	117		
ļ						l .		ı	-	Γotal = Su	m(45) <sub>112</sub> =	=	1165.25	
nstant	aneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46)	) to (61)					
6)m=	18.12	15.85	16.36	14.26	13.68	11.81	10.94	12.55	12.7	14.81	16.16	17.55		(
	storage		والمرابع المرابع			/\// IDC	-4			1				
·		` ,		•			Ū	within sa	ine ves	sei		0		(
	•	•			•	nter 110 nstantar		(47) mbi boil	ers) ente	er 'O' in <i>(</i>	(47)			
	storage		not mate	, (a.i.o ii	.0.4400	- iotal ital	.0000		010) 01110	, o (	,			
) If m	anufact	urer's de	eclared le	oss facto	or is kno	wn (kWh	n/day):					0		
empe	rature fa	actor fro	m Table	2b								0		(
nergy	lost fro	m water	storage	, kWh/ye	ear			(48) x (49)	=			0		(
				-		or is not								
		•	factor fr ee section		e 2 (kW	h/litre/da	ıy)					0		(
	-	eaung s from Tal		JII 4.3								0		
			m Table	2b								0		(
•			storage		ear			(47) x (51)	x (52) x (	53) =		0		
•		54) in (5	_	,	<i>.</i>			( ) (- )	(- ) (	,		0		
ater	storage	loss cal	culated f	or each	month			((56)m = (	55) × (41)ı	m		J		
s)m=	0	0	0	0	0	0	0	0	0	0	0	0		
1	_	-	-					-		_		m Appendi	ix H	
')m=	0	0	0	0	0	0	0	0	0	0	0	0		
· I	ļ											<u> </u>		
	•	•	nual) fro			50\m /	E0) - 20	SE > (44)	m			0		(
	-				,	•	er heatii	35 x (41)		r tharmo	etat)			
(moc	IIIIea nv		OHLIAD	E 🗆 : )	11616 12 7						ייסוכו			

Combi loss calculated f	or each	month (	61)m =	(60) ÷ 3	65 × (41	)m	_			_	_	
(61)m= 41.51 36.13	38.49	35.79	35.48	32.87	33.97	35.4	8 35.79	38.49	38.71	41.51		(61)
Total heat required for	water he	ating ca	lculated	for eac	h month	(62)n	$n = 0.85 \times 10^{-1}$	(45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 162.33 141.8	147.53	130.85	126.69	111.58	106.9	119.	17 120.49	137.2	146.45	158.51		(62)
Solar DHW input calculated u	using Appe	endix G or	Appendix	H (negati	ve quantity	y) (ente	er '0' if no sola	r contribu	tion to wate	er heating)		
(add additional lines if F	FGHRS a	and/or V	VWHRS	applies	, see Ap	pendi	x G)				_	
(63)m= 0 0	0	0	0	0	0	0	0	0	0	0		(63)
Output from water heat	er									_	_	
(64)m= 162.33 141.8	147.53	130.85	126.69	111.58	106.9	119.	17 120.49	137.2	146.45	158.51		_
						(	Output from w	ater heate	er (annual)	112	1609.48	(64)
Heat gains from water I	neating,	kWh/mc	onth 0.2	5 ´ [0.85	× (45)m	+ (61	(m] + 0.8	k [(46)m	+ (57)m	+ (59)m	ı]	
(65)m= 50.55 44.17	45.88	40.55	39.2	34.39	32.74	36.7	7 37.11	42.44	45.5	49.28		(65)
include (57)m in calc	ulation o	f (65)m	only if c	ylinder i	s in the	dwelli	ng or hot w	ater is f	rom com	munity h	neating	
5. Internal gains (see	Table 5	and 5a)	:	•						•		
Metabolic gains (Table		,										
Jan Feb	Mar	Apr	May	Jun	Jul	Au	g Sep	Oct	Nov	Dec	1	
(66)m= 83.92 83.92	83.92	83.92	83.92	83.92	83.92	83.9	<del></del>	83.92	83.92	83.92		(66)
Lighting gains (calculat	ed in Apı	nendix I	eguat	ion I 9 o	rl9a)a	lso se	e Table 5		1	L	ı	
(67)m= 13.33 11.84	9.63	7.29	5.45	4.6	4.97	6.46		11.01	12.85	13.7	1	(67)
Appliances gains (calcu		Į.		L uation I	13 or I 1	Į	!		l .	<u> </u>	ı	
(68)m= 146.19 147.71		135.75	125.48	115.82	109.37	107.8		119.81	130.09	139.74	1	(68)
Cooking gains (calculate						<u> </u>				1	I	` '
(69)m= 31.39 31.39	31.39	31.39	31.39	31.39	31.39	31.3		31.39	31.39	31.39	1	(69)
` '			01.00	01.00	1 01.00	1 01.0	0 1 01.00	1 01.00	01.00	01.00	I	()
Pumps and fans gains (70)m= 3 3	(Table 5	a) 3	3	3	3	3	3	3	3	3	1	(70)
				<u> </u>					1 3	] 3	J	(10)
Losses e.g. evaporation	<del>`                                    </del>		, ,		C7.40	C7.	07.40	C7.40	07.40	07.40	1	(71)
(71)m=   -67.13   -67.13	-67.13	-67.13	-67.13	-67.13	-67.13	-67.1	-67.13	-67.13	-67.13	-67.13	J	(71)
Water heating gains (Ta	<del></del> _	1							T		1	(70)
(72)m= 67.94 65.72	61.66	56.33	52.68	47.76	44.01	49.3	!	57.05	63.2	66.24	J	(72)
Total internal gains =				` `	, , ,	· ` ′	m + (69)m +	·	· · · ·		1	(=a)
(73)m= 278.64 276.45	266.35	250.54	234.78	219.36	209.52	214.8	31 223.06	239.04	257.31	270.85	]	(73)
6. Solar gains:			T									
Solar gains are calculated u	_		l able 6a			itions to		ie applicai		tion.	Ontina	
Orientation: Access Fa Table 6d	actor	Area m²		Flu Ta	ıx ble 6a		g_ Table 6b	Т	FF able 6c		Gains (W)	
O 11 1						, ,						٦
Southeast 0.9x 0.77	X	3.0		-	36.79	] X ]	0.35	×	8.0	=	21.67	<b>」</b> (77)
Southeast 0.9x 0.77	X	3.0	4		62.67	) X [	0.35		0.8	=	36.91	(77)
Southeast 0.9x 0.77	X	3.0	4	X 8	35.75	X	0.35	x	0.8	=	50.5	(77)
Southeast 0.9x 0.77	X	3.0	4	x 1	06.25	X	0.35	x	8.0	=	62.57	(77)
Southeast 0.9x 0.77	X	3.0	4	x 1	19.01	x	0.35	x	0.8	=	70.09	(77)

rtoounte	ourra iri	70 0100 11110		0.010.01				,							
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	1	18.15	x	0.35	x	0.8	=	69.58	(77)
Southea	ast <sub>0.9x</sub>	0.77	x	3.0	)4	X	1	13.91	x	0.35	x	0.8		67.08	(77)
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	x	1	04.39	x	0.35	X	0.8	=	61.48	(77)
Southea	ast <sub>0.9x</sub>	0.77	х	3.0	)4	X	9	2.85	x	0.35	X	0.8	=	54.68	(77)
Southea	ast <sub>0.9x</sub> [	0.77	x	3.0	)4	X	6	9.27	x	0.35	x	0.8		40.79	(77)
Southea	ast <sub>0.9x</sub>	0.77	X	3.0	)4	X	4	4.07	x	0.35	x	0.8		25.95	(77)
Southea	ast <mark>0.9x</mark>	0.77	X	3.0	)4	x	3	31.49	x	0.35	X	0.8	=	18.54	(77)
Southwe	est <sub>0.9x</sub>	0.77	х	6.6	55	x	3	86.79		0.35	X	0.7	=	41.54	(79)
Southwe	est <sub>0.9x</sub>	0.77	Х	6.6	55	X	6	32.67		0.35	X	0.7	=	70.75	(79)
Southwe	est <sub>0.9x</sub>	0.77	x	6.6	i5	X	8	35.75	]	0.35	X	0.7	=	96.81	(79)
Southwe	est <sub>0.9x</sub>	0.77	x	6.6	55	X	1	06.25	Ī	0.35	x	0.7		119.95	(79)
Southwe	est <sub>0.9x</sub>	0.77	X	6.6	55	X	1	19.01	ĺ	0.35	x	0.7		134.35	(79)
Southwe	est <sub>0.9x</sub>	0.77	x	6.6	55	X	1	18.15	ĺ	0.35	x	0.7	=	133.38	(79)
Southwe	est <sub>0.9x</sub>	0.77	x	6.6	55	X	1	13.91	ĺ	0.35	x	0.7	<u> </u>	128.59	(79)
Southwe	est <sub>0.9x</sub>	0.77	X	6.6	55	X	1	04.39	ĺ	0.35	x	0.7		117.85	(79)
Southwe	est <sub>0.9x</sub>	0.77	X	6.6	55	X	9	2.85	ĺ	0.35	x	0.7	=	104.82	(79)
Southwe	est <sub>0.9x</sub>	0.77	x	6.6	55	X	6	9.27	Ī	0.35	x	0.7		78.2	(79)
Southwe	est <sub>0.9x</sub>	0.77	X	6.6	55	X	4	4.07	ĺ	0.35	x	0.7		49.75	(79)
Southwe	est <sub>0.9x</sub>	0.77	x	6.6	55	X	3	31.49	Ì	0.35	x	0.7		35.55	(79)
Solar g	ains in	watts, ca	alculated	for eac	h month	1			(83)m	n = Sum(74)m	n(82)m	1		_	
(83)m=	63.2	107.66	147.31	182.52	204.44	2	02.96	195.67	179	.32 159.5	118.9	9 75.7	54.09		(83)
Total g	ains – i	nternal a	nd solar	(84)m =	= (73)m	+ (	83)m	, watts						•	
(84)m=	341.84	384.11	413.66	433.06	439.22	4	22.31	405.2	394	.13 382.56	358.0	333.01	324.94		(84)
7. Mea	an inter	nal temp	erature	(heating	seasor	า)									
Temp	erature	during h	eating p	eriods ir	the liv	ing	area	from Tal	ole 9	, Th1 (°C)				21	(85)
Utilisa	tion fac	tor for g	ains for I	iving are	ea, h1,n	n (s	ee Ta	ble 9a)			•			•	_
	Jan	Feb	Mar	Apr	May	$\downarrow$	Jun	Jul	Α	ug Sep	Oc	t Nov	Dec		
(86)m=	0.99	0.98	0.93	0.82	0.65		0.46	0.33	0.3	36 0.55	0.84	0.97	0.99		(86)
Mean	interna	l temper	ature in	living are	ea T1 (f	ollo	w ste	ps 3 to 7	7 in T	able 9c)				_	
(87)m=	20.59	20.71	20.84	20.95	20.99		21	21	2	1 21	20.9	5 20.76	20.56		(87)
Temp	erature	during h	eating p	eriods ir	n rest of	f dw	elling/	from Ta	able 9	9, Th2 (°C)	1				
(88)m=	20.39	20.39	20.39	20.4	20.4	7	20.42	20.42	20.	42 20.41	20.4	20.4	20.4	]	(88)
Utilisa	tion fac	tor for g	ains for i	rest of d	wellina.	h2	.m (se	e Table	9a)	•	•	•	•	•	
(89)m=	0.99	0.97	0.92	0.79	0.61	$\overline{}$	0.42	0.29	0.3	31 0.51	0.81	0.96	0.99	]	(89)
Mean	intorna	l temper	ature in	the rest	of dwal	lina	T2 (f	ollow etc	ne 3	to 7 in Tal	hla Oc)	<b>!</b>		J	
(90)m=	19.84	20.01	20.2	20.35	20.4	Ť	20.42	20.42	20.		20.3	6 20.11	19.81	1	(90)
(= -)		I			<u> </u>			I		1		ving area ÷ (		0.62	(91)
N 4	!m4	140	a4	41	ا- مام	. [11] -	~\	. A <del>T</del> 4	. /4	£1.A.\ <del></del> -					<b></b> ` ′
Г	interna 20.3	1 temper 20.44	ature (fo	r the wh	ole dwe	$\overline{}$	g) = f 20.78	LA × T1 20.78		– fLA) × T2	20.7	3 20.51	20.28	1	(92)
(92)m=									20.				20.28	J	(92)
Apply	aujustr	neni to ti	ne mean	ımterna	rempe	ıall	iie iro	ııı rable	40,	where app	ropriate	<del>;</del>			

	to and m	ιραιδ ΙΙΤΙ	Jiiii Gu Dy	uevelo	Jer decre	aration. 7	arry acvi	allonis	certain to	σαιραί	annoron	i rodund.		
93)m=	20.15	20.29	20.45	20.58	20.62	20.63	20.63	20.63	20.62	20.58	20.36	20.13		(93
8. Sp	ace hea	iting requ	uirement											
			ternal ter or gains i	•		ed at ste	ep 11 of	Table 9	b, so tha	t Ti,m=(	76)m an	d re-calc	ulate	
iiic u	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Jtilis		ļ	ains, hm					19						
4)m=		0.97	0.92	0.8	0.63	0.44	0.3	0.33	0.52	0.82	0.96	0.99		(9
Jsef	ul gains,	hmGm	, W = (94	1)m x (8	4)m									
5)m=	337.36	371.78	380.84	347.87	275.59	184.06	123.04	128.67	200.51	293.75	321.14	321.81		(9
/lont	hly aver	age exte	rnal tem	perature	from Ta	able 8		!	!		!			
6)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		(9
leat	loss rate	e for me	an intern	al tempe	erature, l	_m , W =	=[(39)m :	x [(93)m	– (96)m	]	•			
/)m=	509.27	492.6	444.67	365.21	277.83	184.15	123.05	128.67	200.92	310.85	416.47	503.98		(9
Spac	e heatin	g require	ement fo	r each n	nonth, k\	Vh/mont	th = 0.02	24 x [(97	)m – (95	)m] x (4	1)m			
3)m=	127.9	81.19	47.49	12.49	1.67	0	0	0	0	12.73	68.64	135.54		
		•	•				•	Tota	l per year	(kWh/yea	r) = Sum(9	8)15,912 =	487.64	(9
nac	e heatin	a requir	ement in	k\/\/h/m²	2/vear							Г	9.83	_    (9
		• •										L	9.83	
. En	nergy red	quiremer	nts – Indi	vidual h	eating sy	/stems i	ncluding	micro-C	CHP)					
•	e heatir	•										г		٦.
ract	tion of sp	pace hea	at from se	econdar	y/supple	mentary	system					ļ	0	(2
ract	tion of sp	oace hea	at from m	ain syst	em(s)			(202) = 1	- (201) =				1	(2
ract	tion of to	tal heati	ng from i	main sys	stem 1			(204) = (2	02) <b>x</b> [1 –	(203)] =		Ī	1	(2
ffici	ency of	main spa	ace heati	ing syste	em 1							Ì	90.3	٦(2
	-	•	ry/supple			n system	n %					L [	0	    (2
								Λ	Con	Oct	Nov	<u> </u>		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
pac		<del> </del>	ement (c 47.49		1.67	_		Ι ο	١ ،	12.72	69.64	125.54		
						0	0	0	0	12.73	68.64	135.54		
11)n		<del> </del>	)4)] } x 1				ı							(2
	141.64	89.91	52.59	13.83	1.85	0	0	0	0	14.09	76.01	150.1		_
								Tota	ıl (kWh/yea	ar) =Sum(2	211) <sub>15,1012</sub>	,= L	540.02	(2
pac	e heatin	g fuel (s	econdar	y), kWh/	month									
[(98	3 <u>)</u> m x (20	01)] } x 1	00 ÷ (20	8)										
5)m=	0	0	0	0	0	0	0	0	0	0	0	0		
								Tota	l (kWh/yea	ar) =Sum(2	215) <sub>15,1012</sub>	=	0	(2
ater	heating	7										•		_
		-	ter (calc	ulated a	bove)									
-	162.33	141.8	147.53	130.85	126.69	111.58	106.9	119.17	120.49	137.2	146.45	158.51		
ficie	ncy of w	ater hea	ter		-		•	•	-		•	-	81	(2
7)m=	84.85	84.16	83.08	81.73	81.11	81	81	81	81	81.71	83.75	85.04		┙ (2
		heating	kWh/mo	onth			<u> </u>	<u> </u>	ı		<u> </u>			
		•	$0 \div (217)$											
,	191.31	168.49	177.57	160.09	156.19	137.75	131.98	147.12	148.75	167.9	174.87	186.41		
		•						Tota	I = Sum(2	19a) <sub>112</sub> =	•	•	1948.42	(2
าทบะ	al totals										Wh/year	·	kWh/year	
		fuel use	nd main	ovetom.	1					- 1		Г		7
oace	Healinu	linei not	a, mam	System	I							ı	540.02	- 1

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

	,	,			
Water heating fuel used				1948.42	7
Electricity for pumps, fans and electric keep-hot					_
mechanical ventilation - balanced, extract or pos	itive input from outside		121.04		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum of (2	230a)(230g) =		151.04	(231)
Electricity for lighting				235.41	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =			2874.88	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	<b>Emission fa</b> kg CO2/kWh		Emissions kg CO2/yea	
Space heating (main system 1)					
Space heating (main system 1) Space heating (secondary)	kWh/year	kg CO2/kWh		kg CO2/yea	ar
	kWh/year (211) x	kg CO2/kWh	=	kg CO2/yea	ar ](261)
Space heating (secondary)	kWh/year (211) x (215) x	0.216 0.519 0.216	=	kg CO2/yea	ar ](261) ](263)
Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	0.216 0.519 0.216	=	kg CO2/yea 116.65 0 420.86	(261) (263) (264)
Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264)	kg CO2/kWh  0.216  0.519  0.216	= = =	kg CO2/yea 116.65 0 420.86 537.5	(261) (263) (264) (265)
Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year  (211) x  (215) x  (219) x  (261) + (262) + (263) + (264)  (231) x  (232) x	kg CO2/kWh  0.216  0.519  0.216	= = =	kg CO2/yea 116.65 0 420.86 537.5 78.39	(261) (263) (264) (265) (267)

El rating (section 14)

(274)

#### **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

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Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 72.1m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: 405 BP Finchley Rd

Address: 405 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.15 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER)

15.71 kg/m<sup>2</sup>

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 53.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 40.6 kWh/m²

OK
2 Fabric U-values

Florent

 Element
 Average
 Highest

 External wall
 0.15 (max. 0.30)
 0.15 (max. 0.70)
 OK

 Party wall
 0.00 (max. 0.20)
 OK

 Floor
 (no floor)
 0.12 (max. 0.35)
 OK

Roof 0.12 (max. 0.20) 0.12 (max. 0.35)

Openings 0.94 (max. 2.00) 1.20 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

OK

Regulations Compliance Report
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6 Controls			
Space heating controls Hot water controls:	TTZC by plumbing and e	electrical services	ок
	No cylinder		
Boiler interlock:	Yes		ОК
7 Low energy lights			
Percentage of fixed lights wit	h low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames va	ılley):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: North		6.58m²	
Windows facing: East		6.28m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
10 Key features			
Thermal bridging		0.037 W/m²K	
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m²K	
Roofs U-value		0.12 W/m²K	
Party Walls U-value		0.12 W/m²K 0 W/m²K	
i aity vvalis O-value		O VV/III IX	

## **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

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Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 49.38m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: 401 BP Finchley Rd

Address: 401 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 20.07 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 16.67 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 48.1 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 37.4 kWh/m²

OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	OK
Openings	0.97 (max. 2.00)	1.20 (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 3.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

6 Controls			
Space heating controls Hot water controls:	TTZC by plumbing and e No cylinder thermostat	lectrical services	ок
Hot water controls.	No cylinder mermostat  No cylinder		
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights w	rith low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extr	act system		
Specific fan power:		0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames v	valley):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: South Wes		4.58m²	
Windows facing: South Eas	t	2.94m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
10 Key features			
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m²K	
Roofs U-value		0.1 W/m <sup>2</sup> K	
Party Walls U-value		0 W/m²K	

		. Here D	. ( . 1) .						
		User De	etails:						
Assessor Name:	Robyn Berry	5	Stroma	a Num	ber:		STRO	036659	
Software Name:	Stroma FSAP 2012	5	Softwa	re Vei	rsion:		Versio	n: 1.0.5.16	
	F	Property A	\ddress:	401 BP	Finchle	y Rd			
Address :	401 BP Finchley Rd, Londo	n, NW3 5	EY						
1. Overall dwelling dime	nsions:								
		Area			Av. He	ight(m)	,	Volume(m³)	_
Ground floor		49	9.38	(1a) x	2	.54	(2a) =	125.44	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 49	9.38	(4)					
Dwelling volume				(3a)+(3b	)+(3c)+(3c	d)+(3e)+	.(3n) =	125.44	(5)
2. Ventilation rate:									
	main seconda heating heating	ry c	other		total			m³ per hou	r
Number of chimneys		+	0	= [	0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	<u> </u>	0	= [	0	x 2	20 =	0	(6b)
Number of intermittent fa	ns				0	x ′	10 =	0	(7a)
Number of passive vents					0	x ′	10 =	0	(7b)
Number of flueless gas fi	res				0	X 4	40 =	0	(7c)
								_	
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = $(6a)+(6b)+(7a)$	7a)+(7b)+(7	(c) =		0		÷ (5) =	0	(8)
	peen carried out or is intended, procee	ed to (17), ot	therwise c	ontinue fr	om (9) to (	(16)			_
Number of storeys in the	ne dwelling (ns)					7(0)		0	(9)
Additional infiltration	OF for stool or timber from a	. 0 05 for				[(9)-	-1]x0.1 =	0	(10)
	.25 for steel or timber frame or resent, use the value corresponding to			•	uction			0	(11)
deducting areas of openir		o ine greate	i wan are	a (anter					
If suspended wooden f	floor, enter 0.2 (unsealed) or 0	.1 (sealed	d), else	enter 0				0	(12)
If no draught lobby, en	ter 0.05, else enter 0							0	(13)
Percentage of windows	s and doors draught stripped							0	(14)
Window infiltration		O	0.25 - [0.2	x (14) ÷ 1	00] =			0	(15)
Infiltration rate		(	(8) + (10) -	+ (11) + (1	2) + (13)	+ (15) =		0	(16)
•	q50, expressed in cubic metre	-	•	•	etre of e	envelope	area	3	(17)
If based on air permeabil	ity value, then $(18) = [(17) \div 20] + (18)$	8), otherwis	se (18) = (	16)				0.15	(18)
	es if a pressurisation test has been do	ne or a degr	ree air pei	meability	is being u	sed			_
Number of sides sheltere	:d	(	[20] = 1 - [	0 075 v (1	Q\1 <b>-</b>			3	(19)
Shelter factor	lina abaltar faatar				3)] =			0.78	(20)
Infiltration rate incorporat	•	(.	(21) = (18)	X (20) =				0.12	(21)
Infiltration rate modified f	<del></del>	<del></del>	. 1			·	_	1	
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed from Table 7							1	
(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 = (22	2)m ÷ 4								
	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
(		1 3.00	U.U_	•	L	L2	L	I	

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

0.15 0.1	5 0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1	
Calculate effective	_	rate for t	he appli	cable ca	se	ļ		<u>l</u>	<u>!</u>	!	J	_
If mechanical ver		ondiv N (C	3b) = (33	a) × Emy (c	auation (	VEVV otho	avica (22h	) - (222)			0.5	
If balanced with heat			, ,	,	. ,	,, .	,	) = (23a)			0.5	
a) If balanced me	-	-	_					2h\m . /	23h) v [:	1 (22a)	76.5	(
4a)m= 0.27 0.2		0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	]	(
b) If balanced me				ļ	<u> </u>						l	•
4b)m= 0 0	0	0	0	0	0	0	0	0	0	0	]	(
c) If whole house	extract ve	ntilation o	or positiv	re input v	ventilatio	on from o	utside	<u> </u>	<u> </u>	<u>!</u>	1	
if (22b)m < 0			-	-				5 × (23b	)			
4c)m=0	0	0	0	0	0	0	0	0	0	0	]	(
d) If natural venti								o =1				
if $(22b)m = 1$	then (24d)	<del>` ` ` </del>	<del> </del>	· `		<del> </del>				Ι ο	1	(
,	!	0 ntor (24s	0	0	0	0 d\ in hay	0	0	0	0	J	
Effective air char 5)m = 0.27 0.2	<del></del>	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	1	(
<u> </u>				1 0.20	0.20	0.20	0.20	J 0.2 1	0.20	0.20	]	
3. Heat losses and		•									<u>.</u>	
	ross ea (m²)	Openir m		Net Ar A ,r		U-valı W/m2		A X U (W/I	K)	k-value kJ/m²-l		. X k J/K
oors	( )			2.1	x	1.2	=	2.52	$\stackrel{\prime}{\Box}$			(
indows Type 1				4.584	x1.	/[1/( 0.9 )+	0.04] =	3.98				(
indows Type 2				2.936	x1	/[1/( 0.9 )+	0.04] =	2.55				(
alls Type1	38.37	7.52	2	30.85	, x	0.15		4.63	<b>=</b>			
alls Type2	23.86	2.1		21.76	x	0.14	<b>=</b>	3.08	F i		7	<u> </u>
oof	49.38	0		49.38	3 x	0.1	<u> </u>	4.94	<b>=</b>		7 -	<u> </u>
ـــــ otal area of eleme	nts, m²			111.6	2							(
arty wall				18.73	x	0		0				
arty floor				49.38							<b>=</b>	
or windows and roof v	rindows, use	effective w	indow U-va	alue calcul	ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	 n 3.2	
include the areas on			ls and par	titions		(00) (00)	(00)					
abric heat loss, W	`	(U)				(26)(30)		(00) (0)	a) (00 )	(00.)	21.7	
eat capacity Cm =	,	D C	. TEA\:	n la 1/ma21/			***	(30) + (32	, , ,	(32e) =	6419.43	=
nermal mass para or design assessment	,		,			ecisely the		tive Value		ahla 1f	250	(
n be used instead of			CONSTRUCT	ion are no	. Kilowii pi	colsoly the	maidanvo	, values of	11011 111 16	abic II		
nermal bridges : S	(L x Y) ca	lculated	using Ap	pendix l	<						5.03	
details of thermal brid	_	nown (36) :	= 0.05 x (3	31)			(00)	(0.0)				_
otal fabric heat los		المارية ممالة						(36) =	OE\ (5)		26.73	(
entilation heat los	i	1	<u> </u>	مريا	1, ,1	۸۰۰۰		= 0.33 × (			1	
Jan   Fe	b Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	4	,
8)m- 11 10	8 10.76	10 16	10.04	0.44	0.44	1 0 33	0 62	1000	10.75	1 10 50		
B)m= 11 10. eat transfer coeffi		10.16	10.04	9.44	9.44	9.32	9.68	10.04	10.28	10.52	]	(

leat lo	ss para	meter (H	HLP), W	m²K					(40)m	= (39)m ÷	- (4)			
10)m=	0.76	0.76	0.76	0.75	0.74	0.73	0.73	0.73	0.74	0.74	0.75	0.75		
			-41- / <b>T</b> -1-	l- 4-\					,	Average =	Sum(40) <sub>1</sub>	12 /12=	0.75	(4
umbe 	1		nth (Tab		Mov	lup	lul	Λιια	Son	Oct	Nov	Doo		
11)m=	Jan 31	Feb 28	Mar 31	Apr 30	May 31	Jun 30	Jul 31	Aug 31	Sep 30	Oct 31	Nov 30	Dec 31		(4
	31	20	31	30	31	30	31	31	30	31	] 30	31		(
4 Wa	ter heat	ing ener	gy requi	rement:								kWh/ye	ar·	
T. VVA	itor ricat	ing chei	gy roqui	rement.								KVVII/yC	ai.	
if TF.				[1 - exp	(-0.0003	349 x (TF	FA -13.9	)2)] + 0.0	0013 x (¯	ΓFA -13		67		(4
educe	the annua	ıl average	hot water	usage by	5% if the a		designed t	(25 x N) to achieve		se target o		3.91		(4
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
ot wate					,	ctor from 7	Table 1c x		•		!	<u> </u>		
4)m=	81.3	78.34	75.39	72.43	69.48	66.52	66.52	69.48	72.43	75.39	78.34	81.3		
norou	ontont of	hot water	used sel	aulatad me	onthly — 1	100 v Vd r	n v nm v [	Tm / 2600			m(44) <sub>112</sub> = ables 1b, 1	L	886.92	(4
 		105.45	108.81	94.87	91.03	78.55	72.79	83.52	84.52	98.5	107.52			
5)m=	120.57	105.45	100.01	94.67	91.03	76.55	12.19	63.52			m(45) <sub>112</sub> =	116.76	1162.9	
instant	aneous w	ater heatii	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46)		rotar – od	III( <del>40)</del> 112 -		1102.5	`
6)m=	18.09	15.82	16.32	14.23	13.65	11.78	10.92	12.53	12.68	14.78	16.13	17.51		(-
	storage					/\/\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-1	10.1.		1				
•		, ,					_	within sa	ime ves	sei		0		(4
	-	-			-	nter 110 nstantar		(47) mbi boil	ers) ente	er '0' in (	47)			
	storage			(1)					,	•	,			
) If m	anufact	urer's de	eclared l	oss facto	or is kno	wn (kWh	n/day):					0		(
empe	rature fa	actor fro	m Table	2b								0		(-
			storage	-				(48) x (49)	=			0		(
•				-		or is not								,
		_	ee secti		e z (KVV	h/litre/da	iy)					0		(
	-	from Tal		511 4.5								0		(
			m Table	2b							-	0		(
nerav	lost fro	m water	storage	kWh/ve	ear			(47) x (51)	x (52) x (	53) =		0		(
•		54) in (5	_	,					. , ,	,		0		(
ater :	storage	loss cal	culated f	or each	month			((56)m = (	55) × (41)ı	m				
6)m=	0	0	0	0	0	0	0	0	0	0	0	0		(
	er contains	dedicated	d solar sto	rage, (57)ı		x [(50) – (	H11)] ÷ (5	0), else (5	7)m = (56)	m where (	H11) is fro	m Appendi	кН	
7)m=	0	0	0	0	0	0	0	0	0	0	0	0		(
riman	v circuit	loss (on	nual) fro	m Table	. 3		·			<u>!</u>		0		(!
		•	•			59)m = (	(58) ÷ 36	65 × (41)	m			~		
					,	•	. ,	ng and a		r thermo	stat)			
	,							-	•	_	,			

Combi loss calculated for each month (61)m = (60) ÷ 365 × (41)m	(2.1)
(61)m= 41.43 36.06 38.42 35.72 35.4 32.8 33.9 35.4 35.72 38.42 38.64 41.43	(61)
Total heat required for water heating calculated for each month $(62)m = 0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$	
(62)m= 162 141.51 147.23 130.59 126.43 111.35 106.68 118.93 120.24 136.92 146.16 158.19	(62)
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)	(22)
(63)m= 0 0 0 0 0 0 0 0 0 0 0	(63)
Output from water heater	
(64)m= 162 141.51 147.23 130.59 126.43 111.35 106.68 118.93 120.24 136.92 146.16 158.19	(O.1)
Output from water heater (annual) <sub>112</sub> 1606.24	(64)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 x (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m]	
(65)m= 50.45 44.08 45.78 40.47 39.12 34.32 32.68 36.62 37.03 42.36 45.41 49.18	(65)
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= 83.6 83.6 83.6 83.6 83.6 83.6 83.6 83.6	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	
(67)m= 13.68 12.15 9.88 7.48 5.59 4.72 5.1 6.63 8.9 11.3 13.19 14.06	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	
(68)m= 145.64 147.15 143.34 135.23 125 115.38 108.95 107.44 111.25 119.36 129.59 139.21	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	
(69)m= 31.36 31.36 31.36 31.36 31.36 31.36 31.36 31.36 31.36 31.36 31.36	(69)
Pumps and fans gains (Table 5a)	
(70)m= 3 3 3 3 3 3 3 3 3 3 3 3 3	(70)
Losses e.g. evaporation (negative values) (Table 5)	
(71)m= -66.88 -66.88 -66.88 -66.88 -66.88 -66.88 -66.88 -66.88 -66.88 -66.88 -66.88	(71)
Water heating gains (Table 5)	
(72)m= 67.8 65.59 61.54 56.21 52.58 47.66 43.92 49.22 51.44 56.93 63.07 66.1	(72)
Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$	
(73)m= 278.2 275.97 265.84 250.01 234.25 218.85 209.06 214.38 222.67 238.67 256.93 270.46	(73)
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 Area Flux g_ FF Gains	
Table 6d m² Table 6a Table 6b Table 6c (W)	
Southeast 0.9x 0.77 x 2.94 x 36.79 x 0.35 x 0.8 = 20.96	(77)
Southeast 0.9x 0.77 x 2.94 x 62.67 x 0.35 x 0.8 = 35.71	(77)
Southeast 0.9x 0.77 x 2.94 x 85.75 x 0.35 x 0.8 = 48.85	(77)
Southoods of Carry	1 1 1
Southeast 0.9x 0.77 x 2.94 x 106.25 x 0.35 x 0.8 = 60.53	(77)

Nesuits a	πα πραιδ	IIIIOIIII	eu by	uevelop	Jer deci	ara	iliOII. I	Arry Gevi	aliUi	i is certairi	ιο σαιρ	ut umeren	l I Courto	•	
Southeast	0.9x	).77	x	2.9	4	x	1	18.15	x	0.35	x	0.8	=	67.31	(77)
Southeast	0.9x	).77	i x	2.9	4	x	1	13.91	x	0.35	x	0.8	=	64.89	(77)
Southeast	0.9x	).77	X	2.9	4	X	1	04.39	х	0.35	x	0.8	=	59.47	(77)
Southeast	0.9x	).77	×	2.9	4	X	9	92.85	x	0.35	x	0.8	=	52.9	(77)
Southeast	0.9x	).77	X	2.9	4	X	6	9.27	x	0.35	x	0.8	=	39.46	(77)
Southeast	0.9x	).77	X	2.9	4	x	4	4.07	x	0.35	x	0.8	<u> </u>	25.11	(77)
Southeast	0.9x	).77	×	2.9	4	x	3	31.49	x	0.35	x	0.8	<del>-</del>	17.94	(77)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	x	3	86.79	]	0.35	x	0.8	=	32.73	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	X	6	32.67	]	0.35	X	0.8	=	55.75	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	X	8	35.75	]	0.35	X	0.8	=	76.28	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	X	1	06.25	]	0.35	X	0.8	=	94.51	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	X	1	19.01	]	0.35	X	0.8	=	105.86	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	x	1	18.15	]	0.35	x	0.8	=	105.09	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	x	1	13.91	]	0.35	x	0.8	=	101.32	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	x	1	04.39	ĺ	0.35	X	0.8	=	92.85	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	x	9	2.85	]	0.35	x	0.8	=	82.59	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	x	6	9.27	]	0.35	X	0.8	=	61.61	(79)
Southwest	t <sub>0.9x</sub> (	).77	X	4.5	8	X	4	4.07	]	0.35	X	0.8	=	39.2	(79)
Southwest	t <sub>0.9x</sub> (	).77	x	4.5	8	x	3	31.49	]	0.35	x	0.8	=	28.01	(79)
(83)m= 5	ns in watts 33.69 91.4 ns – intern	15 12	5.13	155.04	173.66	1	172.4 83)m	166.21 , watts	(83)m 152	n = Sum(74)m .32 135.49		1	45.95	]	(83)
(84)m= 33	31.89 367.	42 39	0.97	405.05	407.91	3	91.25	375.27	366	358.16	339.7	4 321.24	316.4		(84)
7. Mean	internal te	empera	ature	(heating	seasor	า)									
Tempera	ature durir	ng heat	ing p	eriods ir	the livi	ing	area	from Tal	ole 9	, Th1 (°C)				21	(85)
Utilisatio	on factor fo	r gains	s for I	iving are	a, h1,n	า (ธ	ee Ta	ble 9a)					-	_	
	Jan Fe	eb N	Mar	Apr	May	<u> </u>	Jun	Jul	Α	ug Sep	Oc	Nov	Dec		
(86)m=	0.99 0.9	9 0	.97	0.92	0.79		0.59	0.42	0.4	15 0.68	0.92	0.99	1	]	(86)
Mean in	ternal tem	peratui	re in I	iving are	ea T1 (f	ollo	w ste	ps 3 to 7	7 in T	able 9c)				_	
(87)m= 2	20.39 20.	5 20	0.66	20.85	20.96		21	21	2	1 20.99	20.86	20.6	20.36	]	(87)
Tempera	ature durir	ng heat	ing p	eriods ir	rest of	dw	elling/	from Ta	able 9	9, Th2 (°C)					
(88)m= 2	20.28 20.2	29 20	0.29	20.3	20.3	2	20.31	20.31	20.	31 20.31	20.3	20.3	20.29	]	(88)
Utilisatio	on factor fo	r gains	s for r	est of d	wellina.	h2	.m (se	e Table	9a)	•	•	•	•	-	
	0.99 0.9	<u> </u>	.96	0.89	0.74	_	0.53	0.36	0.3	38 0.62	0.9	0.98	1	]	(89)
— Mean in	ternal tem	neratui	re in 1	the rest	of dwell	lina	T2 (f	ollow ste	ne 3	to 7 in Tab				J	
	9.47 19.6		9.87	20.12	20.26	Ť	20.31	20.31	20.	T T	20.15	19.78	19.44	1	(90)
· / _ ·	1 .3		ļ							1		ving area ÷ (	<u> </u>	0.62	(91)
Moon in	tornal to-	norot	ro /fo	r the we	مام طبین	√II:∽	م/ د	I A 5. T4	. /4	fl A\ To	,				<b>_</b>
_	ternai tem 20.04   20.		re (10 0.36	20.57	20.69	_	g) = 1 20.73	20.74	+ (1	<ul><li>fLA) × T2</li><li>74   20.73</li></ul>	20.59	20.28	20.01	1	(92)
` '						1		l	<u> </u>	where app			20.01	]	(02)
, ipply at	االانامان	1	ouii		Citipe	ull	5 110	I abic	٠٠٠,	σιο αρρι	. opriate	•			

	20.02	20.21	20.42	20.54	20.58	20.59	20.59	20.58	20.44	20.13	19.86		(9
B. Space he Set Ti to the			nnoratiu	ro obtoin	and at at	op 11 of	Table 0	o co tha	t Ti m_/	76)m an	d ro colo	ulato	
he utilisatio					eu ai sie	ерттог	rable 9i	o, so ma	t 11,111=(	rojin an	d re-caid	uiate	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Jtilisation fa					<b>5</b> 5		7.09	ООР		1.101			
)m= 0.99	0.98	0.96	0.9	0.76	0.55	0.38	0.41	0.65	0.9	0.98	0.99		(9
Jseful gains	. hmGm	. W = (94	I)m x (84	 4)m		l				<u>l</u>	l		
i)m= 329.32		375.91	363.74	309.95	215.15	144.14	150.85	231.78	307.13	315.22	314.55		(9
fonthly ave	rage exte	ernal tem	perature	e from Ta	able 8	l				<u> </u>			
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		(!
eat loss ra		an intern		erature. I	m . W =	 =[(39)m :	L x [(93)m	L – (96)m	1				
)m= 588.03		513.99	424.96	325.14	216.43	144.22	150.98	235.74	361.71	482.35	583.34		(!
pace heati	<u> </u>	ement fo	r each n	nonth. k\	Vh/mont	th = 0.02	24 x [(97	l )m – (95		1 1.)m			
m= 192.48	<del> </del>	102.73	44.08	11.3	0	0	0	0	40.61	120.33	199.98		
,					-	ļ	Tota	l ner vear		) = Sum(9	<u> </u>	850.9	٦(٩
				.,			7010	i poi youi	(ittring oai	) = Gain(G	O/15,512 —		_
pace heati	ng requir	ement in	kVVh/m²	/year								17.23	(!
. Energy re	quiremer	nts – Indi	vidual h	eating sy	/stems i	ncluding	micro-C	HP)					
pace heat	ing:												_
raction of s	space hea	at from se	econdar	y/supple	mentary	system						0	(
raction of s	space hea	at from m	ain syst	em(s)			(202) = 1	- (201) =				1	(
raction of t	otal heati	na from i	main svs	stem 1			(204) = (2	02) × [1 –	(203)] =			1	<b> </b>  (:
Efficiency of		•	•									90.3	    (2
•	•		•			- 0/							╡
fficiency of	seconda	ıry/suppie	ementar	y neating	g system	1, % •						0	(2
		l 1.404 l	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Jan	Feb	Mar	Арі	,									
pace heati	ng requir	ement (c	alculate						-			ı	
pace heati		ement (c	alculate		0	0	0	0	40.61	120.33	199.98		
Space heati	ng require	ement (c	alculate 44.08	d above)	_	0	0	0	40.61	120.33	199.98		(:
Space heati	ng require 139.39 8)m x (20	ement (c	alculate 44.08	d above)	_	0	0	0	40.61	120.33	199.98		(2
pace heati 192.48 11)m = {[(9	ng require 139.39 8)m x (20	ement (c 102.73 )4)] } x 1	44.08 00 ÷ (20	d above) 11.3 06)	0	<u> </u>	0	0	44.97	133.25	221.46	942.3	_
192.48 11)m = {[(9 213.16	ng require 3 139.39 8)m x (20 6 154.37	ement (c 102.73 04)] } x 1 113.77	44.08 00 ÷ (20 48.81	11.3 06)	0	<u> </u>	0	0	44.97		221.46	942.3	_
192.48 11)m = {[(9 213.16	ng requires 139.39 8)m x (20) 154.37 ng fuel (s	ement (c 102.73 04)] } x 1 113.77	44.08 00 ÷ (20 48.81 y), kWh/	11.3 06)	0	<u> </u>	0	0	44.97	133.25	221.46	942.3	_
192.48 11)m = {[(9 213.16 pace heating][(98)m x (2	ng requires 139.39 8)m x (20) 6 154.37 ng fuel (s	ement (c 102.73 (24)] } x 1 113.77 econdary 00 ÷ (20	alculated 44.08 00 ÷ (20 48.81 y), kWh/ 8)	d above) 11.3 06) 12.52 month	0	0	0 Tota	0 I (kWh/yea	44.97	133.25	221.46	942.3	_ `
192.48 11)m = {[(9 213.16 Space heating {[(98)m x (2)	ng requires 139.39 8)m x (20) 154.37 ng fuel (s	ement (c 102.73 04)] } x 1 113.77	44.08 00 ÷ (20 48.81 y), kWh/	11.3 06)	0	<u> </u>	0 Tota	0 I (kWh/yea	44.97 ar) =Sum(2	133.25	221.46		](2
Space heating 192.48  11)m = {[(9) 213.16  Space heating ([(98)m x (2) 15)m= 0	ng requires 139.39 8)m x (20 154.37 ng fuel (section 1) } x 1	ement (c 102.73 (24)] } x 1 113.77 econdary 00 ÷ (20	alculated 44.08 00 ÷ (20 48.81 y), kWh/ 8)	d above) 11.3 06) 12.52 month	0	0	0 Tota	0 I (kWh/yea	44.97 ar) =Sum(2	133.25	221.46	942.3	] (;
192.48 11)m = {[(9) 213.16  Epace heatin [((98)m x (2) 5)m= 0	ng requires 139.39 8)m x (20 6 154.37 ng fuel (section 1) } x 1 0	ement (c 102.73 (24)] } x 1 113.77 econdary 00 ÷ (20	alculate 44.08 00 ÷ (20 48.81 y), kWh/ 8)	d above) 11.3 06) 12.52 month	0	0	0 Tota	0 I (kWh/yea	44.97 ar) =Sum(2	133.25	221.46		] (:
192.48 11)m = {[(9) 213.16  Epace heating [(98)m x (2) 5)m= 0  ater heating attribut from y	ng requires 139.39 8)m x (20) 6 154.37 ng fuel (second) 3 x 1 0 ng	ement (c 102.73 04)] } x 1 113.77 econdary 00 ÷ (20 0	alculated alcula	d above)  11.3  06)  12.52  month  0	0 0	0	0 Tota	0 I (kWh/yea 0 I (kWh/yea	44.97 ar) =Sum(2 0 ar) =Sum(2	133.25 211) <sub>15,1012</sub> 0	221.46		](2
Space heating 192.48  11)m = {[(9) 213.16]  Space heating [(98)m x (2) 215)m = 0  ater heating utput from verification in the second content of the second	ng requires 139.39 8)m x (20 6 154.37  ng fuel (second)] } x 1  0  ng  vater hear 141.51	ement (c 102.73 (24)] } x 1 113.77 secondary 00 ÷ (20 0	alculate 44.08 00 ÷ (20 48.81 y), kWh/ 8)	d above) 11.3 06) 12.52 month	0	0	0 Tota	0 I (kWh/yea	44.97 ar) =Sum(2	133.25	221.46	0	
Epace heatin 192.48  11)m = {[(9) 213.16}  Epace heatin {[(98)m x (2) 15)m= 0}  ater heatin utput from v 162  ficiency of v	ng requires 139.39 8)m x (20 6 154.37 ng fuel (second)] } x 1 0  ng water hear 141.51 water hear	ement (c 102.73 04)] } x 1 113.77 secondary 00 ÷ (20 0 outer (calculater) 147.23 ater	alculated 44.08 00 ÷ (20 48.81 y), kWh/8) 0 ulated al 130.59	d above) 11.3 16) 12.52 1 month 0 126.43	0 0 111.35	0 0 106.68	0 Tota 0 Tota 118.93	0 I (kWh/yea 0 I (kWh/yea	44.97  0  ar) =Sum(2  136.92	133.25 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	221.46		
Epace heating 192.48  11)m = {[(9.60] 213.16  Epace heating [((98)m x (2.60) 5)m= 0  ater heating 162  ficiency of v (7)m= 85.8	8)m x (20 6 154.37 ng fuel (s 201)] } x 1 0 ng fuel (s 141.51 water hea 85.36	ement (c 102.73 (24)] } x 1 113.77 secondary 00 ÷ (20 0 0 oter (calculater) 147.23 ater 84.58	alculated 44.08  00 ÷ (20  48.81  y), kWh/8)  0  ulated al  130.59	d above)  11.3  06)  12.52  month  0	0 0	0	0 Tota	0 I (kWh/yea 0 I (kWh/yea	44.97 ar) =Sum(2 0 ar) =Sum(2	133.25 211) <sub>15,1012</sub> 0	221.46	0	
Epace heating 192.48  11)m = {[(9)	ng requires 139.39 8)m x (20 154.37  ng fuel (s 201)] } x 1 0  ng water hea 141.51 water hea 85.36 r heating,	ement (c 102.73 (2)] } x 1 113.77 econdary 00 ÷ (20 0 0 oter (calculater) 147.23 ater 84.58 , kWh/mc	alculated 44.08  00 ÷ (20  48.81  y), kWh/8)  0  ulated al  130.59  83.16  onth	d above) 11.3 16) 12.52 1 month 0 126.43	0 0 111.35	0 0 106.68	0 Tota 0 Tota 118.93	0 I (kWh/yea 0 I (kWh/yea	44.97  0  ar) =Sum(2  136.92	133.25 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	221.46	0	
Epace heatin 192.48  11)m = {[(9) 213.16}  Epace heatin ([(98)m x (2) 15)m= 0   ater heatin utput from v 162  ficiency of v 17)m= 85.8  uel for water 19)m = (64	ng requires 139.39 8)m x (20 6 154.37 ng fuel (second)] } x 1 0  ng water heat 141.51 water heat 85.36 r heating, h)m x 100	ement (c 102.73 (24)] } x 1 113.77 secondary 00 ÷ (20 0 147.23 ater 84.58 , kWh/mc 0 ÷ (217)	alculated 44.08 00 ÷ (20 48.81 y), kWh/8) 0 ulated al 130.59 83.16 onth	d above) 11.3 16) 12.52  month 0 126.43 81.69	0 0 111.35	0 0 106.68	0 Tota 0 Tota 118.93	0 I (kWh/yea 0 I (kWh/yea 120.24	44.97  0  ar) =Sum(2  136.92	133.25 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub> 146.16	221.46 = 0 = 158.19	0	
Epace heatin 192.48  11)m = {[(9) 213.16}  Epace heatin {[(98)m x (2) 15)m= 0}  ater heatin utput from v 162  ficiency of v 17)m= 85.8  uel for water 19)m = (64)	ng requires 139.39 8)m x (20 6 154.37 ng fuel (second)] } x 1 0  ng water heat 141.51 water heat 85.36 r heating, h)m x 100	ement (c 102.73 (2)] } x 1 113.77 econdary 00 ÷ (20 0 0 oter (calculater) 147.23 ater 84.58 , kWh/mc	alculated 44.08  00 ÷ (20  48.81  y), kWh/8)  0  ulated al  130.59  83.16  onth	d above) 11.3 16) 12.52 1 month 0 126.43	0 0 111.35	0 0 106.68	0 Tota 0 Tota 118.93	0 I (kWh/yea 0 I (kWh/yea 120.24 81	44.97  0  136.92  82.95	133.25 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub>	221.46	81	(2
Space heatin 192.48  11)m = {[(9) 213.16}  Space heatin {[(98)m x (2) 15)m= 0}  Stater heatin utput from v 162  If ciency of v 17)m= 85.8  uel for water 19)m = (64 19)m= 188.81	ng requires 139.39 8)m x (20 6 154.37  ng fuel (second)] } x 1  0  ng water hea	ement (c 102.73 (24)] } x 1 113.77 secondary 00 ÷ (20 0 147.23 ater 84.58 , kWh/mc 0 ÷ (217)	alculated 44.08 00 ÷ (20 48.81 y), kWh/8) 0 ulated al 130.59 83.16 onth	d above) 11.3 16) 12.52  month 0 126.43 81.69	0 0 111.35	0 0 106.68	0 Tota 0 Tota 118.93	0 I (kWh/yea 0 I (kWh/yea 120.24	44.97  0  136.92  82.95  165.05  19a) <sub>112</sub> =	133.25 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub> 146.16 84.95	221.46 = 0 = 158.19 85.94	81 1926.09	(2 ](2 ](2 ](2 ](2
11)m = {[(9) 213.16  Space heatin {[(98)m x (2) 15)m= 0  Stater heatin utput from v 162  fficiency of v	ng requires 139.39 8)m x (20 6 154.37  ng fuel (section 150.37)	ement (c 102.73 (24)] } x 1 113.77 econdary 00 ÷ (20 0 147.23 ater 84.58 , kWh/mc 0 ÷ (217) 174.07	alculated 44.08  00 ÷ (20  48.81  y), kWh/8)  0  ulated al  130.59  83.16  onth  m  157.03	d above) 11.3  16) 12.52  month 0  126.43  81.69	0 0 111.35	0 0 106.68	0 Tota 0 Tota 118.93	0 I (kWh/yea 0 I (kWh/yea 120.24 81	44.97  0  136.92  82.95  165.05  19a) <sub>112</sub> =	133.25 211) <sub>15,1012</sub> 0 215) <sub>15,1012</sub> 146.16	221.46 = 0 = 158.19 85.94	81	

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

results and inputs informed by developer deciale	mon. Any adviation is do	rtair to output uniorer	n rodana.		
Water heating fuel used				1926.09	]
Electricity for pumps, fans and electric keep-hot					_
mechanical ventilation - balanced, extract or pos	itive input from outside		120.51		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum of	(230a)(230g) =		150.51	(231)
Electricity for lighting				241.63	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =			3260.53	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	Emission fac kg CO2/kWh	ctor	Emissions kg CO2/yea	ır
Space heating (main system 1)			etor =		ır ](261)
Space heating (main system 1) Space heating (secondary)	kWh/year	kg CO2/kWh		kg CO2/yea	_
	kWh/year (211) x	kg CO2/kWh	=	kg CO2/yea	(261)
Space heating (secondary)	kWh/year (211) x (215) x	0.216 0.519 0.216	=	kg CO2/yea	(261) (263)
Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	0.216 0.519 0.216	=	kg CO2/yea 203.54 0 416.03	(261) (263) (264)
Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264)	kg CO2/kWh  0.216  0.519  0.216  4) =	= =	kg CO2/yea 203.54 0 416.03 619.57	(261) (263) (264) (265)
Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264) (231) x	kg CO2/kWh  0.216  0.519  0.216  4) =	= = =	kg CO2/yea 203.54 0 416.03 619.57 78.12	(261) (263) (264) (265) (267)

El rating (section 14)

(274)

## **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.16 Printed on 03 August 2022 at 12:20:05

Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 99.23m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: G05 BP Finchley Rd

Address: G05 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.45 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 14.20 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 56.8 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 40.0 kWh/m²

OK
2 Fabric U-values

Element Average Highest

External wall 0.14 (max. 0.30) 0.15 (max. 0.70) OK
Party wall 0.00 (max. 0.20) - OK
Floor 0.10 (max. 0.25) 0.10 (max. 0.70) OK

Roof (no roof)

Openings 0.93 (max. 2.00) 1.20 (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 3.00 (design value)

Maximum 10.0 **OK** 

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Controls			
Space heating controls	TTZC by plumbing and e	lectrical services	ОК
Hot water controls:	No cylinder thermostat		
	No cylinder		
Boiler interlock:	Yes		OK
ow energy lights			
Percentage of fixed lights wi	th low-energy fittings	100.0%	
Minimum		75.0%	OK
Mechanical ventilation			
Continuous supply and extra	act system		
Specific fan power:		0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
Summertime temperature			
Overheating risk (Thames va	alley):	Slight	OK
ed on:			
Overshading:		Average or unknown	
Windows facing: North		14.76m²	
Windows facing: North West		1.67m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
Key features			
Thermal bridging		0.032 W/m²K	
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m²K	
Party Walls U-value		0 W/m²K	
Floors U-value		0.1 W/m <sup>2</sup> K	

## **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.16 Printed on 03 August 2022 at 12:20:05

Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 92.67m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: G04 BP Finchley Rd

Address: G04 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.46 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 13.01 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 46.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 33.4 kWh/m²

OK
2 Fabric U-values

Flowers

 Element
 Average
 Highest

 External wall
 0.15 (max. 0.30)
 0.15 (max. 0.70)
 OK

 Party wall
 0.00 (max. 0.20)
 OK

 Floor
 0.10 (max. 0.25)
 0.10 (max. 0.70)
 OK

Roof (no roof)

Openings 0.93 (max. 2.00) 1.20 (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 3.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

6 Controls			
Space heating controls	TTZC by plumbing and e	lectrical services	ОК
Hot water controls:	No cylinder thermostat		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights w	ith low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extra	act system		
Specific fan power:		0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames v	alley):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: South Wes	t	3.58m²	
Windows facing: West		7.18m²	
Windows facing: North		3.1m²	
Windows facing: South		3.1m²	
Windows facing: North Wes	t	3.38m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
10 Key features			
Thermal bridging		0.025 W/m²K	
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m²K	
Party Walls U-value		0 W/m²K	
Floors U-value		0.1 W/m²K	
		•	

			User D	etails:						
Assessor Name:	Robyn Berry			Strom	a Num	her:		STRO	036659	
Software Name:	Stroma FSAP 201	2		Softwa					n: 1.0.5.16	
		Pi	roperty .	Address	405 BP	Finchle	y Rd			
Address :	405 BP Finchley Rd	l, Londor	n, NW3	5EY						
1. Overall dwelling dime	ensions:									
Ground floor				a(m²)	(4.5)		ight(m)	7(0=)	Volume(m³)	_
				72.1	(1a) x	2	2.54	(2a) =	183.14	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e	e)+(1n	)	72.1	(4)					_
Dwelling volume					(3a)+(3b)	)+(3c)+(3c	d)+(3e)+	(3n) =	183.14	(5)
2. Ventilation rate:	<u> </u>									
		econdar neating	y	other		total			m³ per hou	•
Number of chimneys	0 +	0	+	0	] = [	0	X e	40 =	0	(6a)
Number of open flues	0 +	0	+	0	=	0	x :	20 =	0	(6b)
Number of intermittent fa	ins				Ī	0	X	10 =	0	(7a)
Number of passive vents	<b>.</b>				Ē	0	x	10 =	0	(7b)
Number of flueless gas fi	ires				F	0	x	40 =	0	☐ (7c)
<b>C</b>					L					`` ′
								Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = (6	a)+(6b)+(7	a)+(7b)+(	7c) =		0		÷ (5) =	0	(8)
If a pressurisation test has b		ed, proceed	d to (17), d	otherwise o	ontinue fr	om (9) to	(16)			- -
Number of storeys in the Additional infiltration	ne dwelling (ns)						[(0)	11,0 1	0	(9)
Structural infiltration: 0	25 for steel or timber	frame or	0 35 for	r masonr	v constr	ruction	[(9)	-1]x0.1 =	0	(10) (11)
	resent, use the value corres				•	dottori			0	
deducting areas of opening										_
If suspended wooden f	,	ed) or 0.	1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, en Percentage of windows		rinned							0	(13)
Window infiltration	s and doors draught st	iippeu		0.25 - [0.2	x (14) ÷ 1	001 =			0	(14) (15)
Infiltration rate				(8) + (10)		_	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cub	oic metre	s per ho	our per s	quare m	etre of e	envelope	area	3	(17)
If based on air permeabil	lity value, then (18) = [(1	7) ÷ 20]+(8	3), otherwi	ise (18) = (	16)		-		0.15	(18)
Air permeability value applie		s been don	e or a deg	gree air pe	rmeability	is being u	sed			<u>-</u>
Number of sides sheltere	ed .			(20) = 1 -	'n 075 v (1	(Q)1 <b>—</b>			3	(19)
Shelter factor Infiltration rate incorporat	ting shalter factor			(20) = 13 (21) = (18)		3)] =			0.78	(20)
Infiltration rate modified f	-	1		(21) - (10)	/ X (20) =				0.12	(21)
Jan Feb	Mar Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp		1 3011		, " <del>"</del>	Cop	1 000	1	1 200	I	
(22)m= 5.1 5	4.9 4.4 4.3	3.8	3.8	3.7	4	4.3	4.5	4.7		
. ,		<u> </u>		I	<u> </u>	<u> </u>	1	I	I	
Wind Factor (22a)m = (22	2)m ÷ 4								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		

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

0.15 0.1	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14		
Calculate effective	-	rate for t	he appli	cable ca	se					•	, 	<u> </u>
If mechanical ver		endix N (2	(23a) = (23a	a) × Fmv (e	equation (1	N5)) othe	rwise (23h	) = (23a)			0.5	
If balanced with heat			, ,	,	. ,	,, .	,	) = ( <b>20</b> 0)			0.5	
a) If balanced me	-	-	_					2h)m + (	23h) <b>x</b> [	1 – (23c)	76.5 - 1001	(2
24a)m= 0.27 0.2		0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	]	(2
b) If balanced me	 chanical ve	entilation	without	heat red	covery (N	иV) (24b	)m = (22	2b)m + (	23b)	!	ı	
24b)m= 0 0	0	0	0	0	0	0	0	0	0	0	]	(2
c) If whole house	extract ver	ntilation o	or positiv	e input v	ventilatio	on from o	utside		!		•	
if (22b)m < 0	5 × (23b),	then (24	c) = (23b	o); other	wise (24	c) = (22h	o) m + 0.	5 × (23b	)		,	
$4c)m = 0 \qquad 0$	0	0	0	0	0	0	0	0	0	0	]	(
d) If natural ventil								0.51				
	nen (24d)	$\frac{1}{1} = \frac{221}{0}$	o)m otne		4a)m =	0.5 + <u>[(</u> 2	20)m² x	0.5]	0	0	1	(
Effective air chan		<u> </u>	<u> </u>								J	`
5)m= 0.27 0.2		0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.25	0.25	1	(
<u> </u>		L									l	
B. Heat losses and		•		NI a ( A a		11 -1		A 37.11		1 -1		V I
	ross ea (m²)	Openin m		Net Ar A ,r		U-val W/m2		A X U (W/I		k-value kJ/m²-l		X k J/K
oors				2.1	x	1.2		2.52	,			(
indows Type 1				6.582	<u>x</u> 1	/[1/( 0.9 )+	0.04] =	5.72	Ħ			(
indows Type 2				6.275	x1	/[1/( 0.9 )+	0.04] =	5.45	Ħ			(
alls Type1	54.49	12.8	6	41.64	x	0.15	i  - 	6.25	Ħ ſ			
alls Type2	30.58	2.1		28.48	3 x	0.14	<b>=</b>	4.03	Ħ i		<b>i</b> i i i i i i i i i i i i i i i i i i	$\equiv$
oof	72.1	0		72.1	x	0.12	<b>=</b>	8.65	F i		7 -	<u> </u>
otal area of eleme	nts, m²			157.1	7							(
arty wall				13.1	x	0		0				
arty floor				72.1							<b>i</b> i	<u> </u>
or windows and roof w	indows, use e	effective wi	indow U-va	alue calcul	ated using	g formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	1 3.2	
include the areas on b			ls and par	titions		(00) (00)	(20)					
abric heat loss, W	•	U)				(26)(30)		(20) . (2)	n) . (20-)	(20-)	32.62	
eat capacity Cm =	,	D – Cm	· TEA\ ir	. k 1/m2k				(30) + (32 tive Value		(32e) =	8329.56	=
nermal mass para or design assessments	,		,			recisely the				ahle 1f	250	
n be used instead of a			0077011.000			colooly un		74.4000		u		
nermal bridges : S	(L x Y) cal	lculated	using Ap	pendix l	<						5.76	(
details of thermal bridgotal fabric heat los	-	nown (36) =	= 0.05 x (3	11)			(00)	(0.0)				
משו ושמות משוביו ומכ		d marte!						(36) =	'0E\m +- /E'	۱	38.38	(
		a monthl	у • • • • • • • • • • • • • • • • • • •			<u> Λ</u>		= 0.33 × (	Nov (5)	Dec	1	
entilation heat los		Anr	Mari	صبيا ا	11,1				. 131(1)/		•	
Jan Fe	b Mar	Apr	May	Jun 13.78	Jul 13.78	13.6	Sep 14.13	-	-	+		(
entilation heat los	b Mar 8 15.71	Apr 14.83	May 14.65	Jun 13.78	Jul 13.78	13.6	14.13	14.65	15.01	15.36		(

eat lo	ss para	meter (F	HLP), W	m²K					(40)m	= (39)m ÷	- (4)			
0)m=	0.76	0.75	0.75	0.74	0.74	0.72	0.72	0.72	0.73	0.74	0.74	0.75		
م ما ممت			ath /Tab	la 1a\					,	Average =	Sum(40) <sub>1</sub> .	12 /12=	0.74	(4
umbe 	Jan	Feb	nth (Tab Mar		May	Jun	Jul	Λιια	Sep	Oct	Nov	Dec		
1)m=	31	28	31	Apr 30	May 31	30	31	Aug 31	30 30	31	30	31		(4
.,	01		<u> </u>		01		<u> </u>	<u> </u>	00	<u> </u>		<u> </u>		`
1 Wa	ter heat	ing ener	rgy requi	rement:								kWh/ye	ar.	
				TOTTIOTIC.								ikvvii, yk	, ar.	
if TF.			N + 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9	)2)] + 0.0	0013 x (¯	ΓFA -13.		3		(4
educe	the annua	l average	ater usag hot water person per	usage by	5% if the a	lwelling is	designed t			se target o		3.73		(4
]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
l ot wate			day for ea						Оер	Oct	INOV	Dec		
4)m=	97.61	94.06	90.51	86.96	83.41	79.86	79.86	83.41	86.96	90.51	94.06	97.61		
	ļ.					ļ.	ļ.	ļ.			m(44) <sub>112</sub> =		1064.79	(
nergy c	content of	hot water	used - cal	culated mo	onthly = $4$ .	190 x Vd,r	n x nm x E	Tm / 3600	kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		
5)m=	144.75	126.6	130.64	113.89	109.28	94.3	87.38	100.27	101.47	118.26	129.09	140.18		_
instant	aneous w	ater heati	ng at point	of use (no	hot water	r storage).	enter 0 in	boxes (46		Total = Su	m(45) <sub>112</sub> =	=	1396.11	(
6)m=	21.71	18.99	19.6	17.08	16.39	14.15	13.11	15.04	15.22	17.74	19.36	21.03		(-
	storage		.0.0		.0.00						10.00	200		`
torage	e volum	e (litres)	includin	g any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0		(-
	•	•	nd no ta		•			` '						
	/ise if no storage		hot wate	er (this in	icludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (	47)			
	•		eclared l	oss facto	or is kno	wn (kWł	n/day):					0		(-
•			m Table			`	, , ,					0		(-
•			storage		ear			(48) x (49)	=			0		(
) If m	anufact	urer's de	eclared o	ylinder l	oss fact									•
		_	factor fr		e 2 (kW	h/litre/da	ıy)					0		(
	•	eating s from Ta	ee section	on 4.3								0		(:
			m Table	2b							-	0		(:
nerav	lost fro	m water	storage	. kWh/ve	ear			(47) x (51)	x (52) x (	53) =		0		(
		54) in (5	-	, ,							_	0		(
ater :	storage	loss cal	culated f	or each	month			((56)m = (	55) × (41)ı	m				
6)m=	0	0	0	0	0	0	0	0	0	0	0	0		(
	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	
7)m=	0	0	0	0	0	0	0	0	0	0	0	0		(
riman	v circuit	loss (an	nual) fro	m Table	3 3							0		(:
	•	•	culated t			59)m = (	(58) ÷ 36	65 × (41)	m			-		
	•		rom Tab		,	•	. ,	, ,		r thermo	stat)			
9)m=	0	0	0	0	0	0	0	0	0	0	0	0		(

Combi loss of	calculated	for each	month (	(61)m =	(60) ÷ 3	65 × (41	)m					•	
(61)m= 49.74	43.29	46.12	42.88	42.5	39.38	40.7	42.	42.88	46.12	46.38	49.74		(61)
Total heat re	equired for	water h	eating ca	alculated	for eac	h month	(62)r	$n = 0.85 \times$	(45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 194.4	9 169.89	176.76	156.77	151.79	133.68	128.08	142.	78 144.36	164.38	175.47	189.92		(62)
Solar DHW inpu									ır contribu	tion to wate	er heating)		
(add addition	nal lines if	FGHRS	and/or \	VWHRS	applies	, see Ap	pend	x G)		•		,	
(63)m= 0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output from	water hea												
(64)m= 194.4	9 169.89	176.76	156.77	151.79	133.68	128.08	142.	78 144.36	164.38	175.47	189.92		_
							(	Output from w	ater heate	er (annual)	112	1928.36	(64)
Heat gains f	rom water	heating	, kWh/m	onth 0.2	5 ´ [0.85	× (45)m	+ (6	l)m] + 0.8	x [(46)m	+ (57)m	+ (59)m	]	
(65)m= 60.56	52.92	54.97	48.59	46.96	41.2	39.23	43.9	7 44.46	50.85	54.52	59.04		(65)
include (5	7)m in cald	culation	of (65)m	only if c	ylinder i	s in the	dwelli	ng or hot w	ater is f	rom com	munity h	neating	
5. Internal	gains (see	Table 5	5 and 5a	):									
Metabolic ga	ains (Table	5), Wa	tts										
Jan		Mar	Apr	May	Jun	Jul	Αι	g Sep	Oct	Nov	Dec		
(66)m= 114.8	1 114.81	114.81	114.81	114.81	114.81	114.81	114.	31 114.81	114.81	114.81	114.81		(66)
Lighting gair	ns (calcula	ted in A	pendix	L, equat	ion L9 o	r L9a), a	lso se	ee Table 5	•	•	•	1	
(67)m= 18.44	16.37	13.32	10.08	7.54	6.36	6.87	8.94	11.99	15.23	17.77	18.95	]	(67)
Appliances of	gains (calc	ulated ir	n Append	dix L, eq	uation L	13 or L1	3a), a	lso see Ta	ble 5	•	•	•	
(68)m= 202.1	6 204.25	198.97	187.71	173.51	160.16	151.24	149.	14 154.43	165.68	179.89	193.24	]	(68)
Cooking gair	ns (calcula	ted in A	ppendix	L, equat	ion L15	or L15a	), also	see Table	÷ 5	•		•	
(69)m= 34.48	<del>`</del>	34.48	34.48	34.48	34.48	34.48	34.4		34.48	34.48	34.48		(69)
Pumps and f	fans gains	(Table	5a)						•		•	ı	
(70)m= 3	3	3	3	3	3	3	3	3	3	3	3		(70)
Losses e.g.	evaporatio	n (nega	tive valu	es) (Tab	le 5)				·				
(71)m= -91.8	<del></del>	-91.84	-91.84	-91.84	-91.84	-91.84	-91.8	34 -91.84	-91.84	-91.84	-91.84	]	(71)
Water heating	ng gains (T	able 5)			Į.	•	•					•	
(72)m= 81.4	<del> </del>	73.88	67.49	63.12	57.22	52.73	59.	61.75	68.35	75.72	79.36		(72)
Total intern	al gains =				(66)	)m + (67)m	1 + (68)	m + (69)m +	(70)m + (7	71)m + (72)	)m		
(73)m= 362.4	<del></del>	346.61	325.72	304.61	284.18	271.28	277.	61 288.61	309.7	333.82	351.99		(73)
6. Solar gai	ins:												
Solar gains ar	e calculated	using sola	r flux from	Table 6a	and assoc	iated equa	tions to	convert to the	ne applica	ble orienta	tion.		
Orientation:			Area		Flu			<b>g_</b>		FF		Gains	
	Table 6d		m²		Ta	ble 6a		Table 6b	T	able 6c		(W)	
North 0.93	× 0.77	х	6.5	58	<b>X</b> 1	10.63	x [	0.35	x	0.8	=	13.58	(74)
North 0.93	v 0.77	х	6.5	58	x 2	20.32	x	0.35	x	0.8	=	25.95	(74)
North 0.9	0.77	x	6.5	58	x (	34.53	x	0.35	x [	0.8	=	44.1	(74)
North 0.93	× 0.77	X	6.5	58	x = 5	55.46	x	0.35	x [	0.8	=	70.84	(74)
North 0.9	× 0.77	X	6.5	58	x 7	74.72	x	0.35	x [	0.8	=	95.42	(74)

North														
NOILII	0.9x	0.77	X	6.5	58	x	79.99	x	0.35	x	0.8	=	102.16	(74)
North	0.9x	0.77	x	6.5	58	x	74.68	x	0.35	x	0.8	=	95.37	(74)
North	0.9x	0.77	x	6.5	58	x	59.25	x	0.35	x	0.8	=	75.67	(74)
North	0.9x	0.77	x	6.5	58	x	41.52	x	0.35	x	0.8	=	53.02	(74)
North	0.9x	0.77	x	6.5	58	x	24.19	x	0.35	x	0.8	=	30.89	(74)
North	0.9x	0.77	x	6.5	58	x	13.12	x	0.35	x	0.8	=	16.75	(74)
North	0.9x	0.77	x	6.5	58	x	8.86	x	0.35	x	0.8	<u> </u>	11.32	(74)
East	0.9x	0.77	x	6.2	28	х	19.64	x	0.35	x	0.8	<del>-</del> = [	23.91	(76)
East	0.9x	0.77	X	6.2	28	x	38.42	x	0.35	×	0.8	=	46.78	(76)
East	0.9x	0.77	x	6.2	28	x	63.27	x	0.35	x	0.8	=	77.04	(76)
East	0.9x	0.77	x	6.2	28	х	92.28	x	0.35	x	0.8	<del>-</del> = [	112.36	(76)
East	0.9x	0.77	x	6.2	28	x	113.09	x	0.35	x	0.8	<del>-</del>	137.7	(76)
East	0.9x	0.77	x	6.2	28	x	115.77	x	0.35	x	0.8	= =	140.96	(76)
East	0.9x	0.77	x	6.2	28	x	110.22	x	0.35	x	0.8	<u> </u>	134.2	(76)
East	0.9x	0.77	x	6.2	28	x	94.68	x	0.35	x	0.8	=	115.28	(76)
East	0.9x	0.77	x	6.2	28	x	73.59	x	0.35	x	0.8	<del>=</del>	89.6	(76)
East	0.9x	0.77	x	6.2	28	x $\overline{\ }$	45.59	x	0.35	x	0.8	<del>=</del>	55.51	(76)
East	0.9x	0.77	X	6.2	28	x	24.49	x	0.35	x	0.8	=	29.82	(76)
East	0.9x	0.77	X	6.2	28	х	16.15	X	0.35	×	0.8		19.67	(76)
Ī	37.49 ains – ir	72.73 nternal ar	121.14 nd solar	183.2 (84)m =	233.13 = (73)m	243. + (83		190	.95 142.63	86.4	46.57	30.99		(83)
(84)m =						Ò	·	_			_		l	
(01)	399.93	432.55	467.75	508.92	537.73	527	·	468	.56 431.24	396.1	380.39	382.97		(84)
`		432.55 nal tempe				527	<u> </u>	468	56 431.24	396.1	380.39	382.97		(84)
7. Mea	an inter	nal tempe	erature	(heating	season	527	<u> </u>			396.1	380.39	382.97	21	(84)
7. Mea	an inter erature	nal tempe during he	erature eating p	(heating eriods ir	season the livi	527 ) ng ar	7.3 500.86			396.1	380.39	382.97	21	
7. Mea	an inter erature	nal tempe during he	erature eating p	(heating eriods ir	season the livi	527 ) ng ar	ea from Tale Table 9a)	ble 9		396.1 Oct	380.39 Nov	382.97 Dec	21	(85)
7. Mea	an inter erature tion fac	nal tempe during he tor for ga	erature eating p	(heating eriods ir iving are	season the livi ea, h1,m	527 ) ng ar	ea from Tal Table 9a) un Jul	ble 9	Th1 (°C)				21	
7. Mea Tempe Utilisat	erature tion fac Jan	nal tempe during he tor for ga Feb	erature eating p tins for l Mar 0.99	(heating eriods ir iving are Apr 0.96	season the livi ea, h1,m May	527 ) ng ar (see	ea from Tal Table 9a) un Jul	ble 9,	Th1 (°C)  ug Sep	Oct	Nov	Dec	21	(85)
7. Mea Tempe Utilisat	erature tion fac Jan	nal tempe during he tor for ga Feb	erature eating p tins for l Mar 0.99	(heating eriods ir iving are Apr 0.96	season the livi ea, h1,m May	527 ) ng ar (see	ea from Tal 2 Table 9a) un Jul 2 0.46 steps 3 to 7	ble 9,	Th1 (°C)  ug Sep 1 0.79  Table 9c)	Oct	Nov	Dec	21	(85)
7. Mea Tempe Utilisat (86)m= Mean (87)m=	erature tion factor Jan 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nal temper during he tor for ga Feb 1 I tempera	erature eating p ains for I Mar 0.99 ature in	(heating eriods ir iving are 0.96 living are 20.78	season the livi ea, h1,m May 0.84 ea T1 (fo	527 ) ng ar (see Ju 0.6 ollow 20.9	ea from Tal 2 Table 9a) un Jul 2 0.46 steps 3 to 7	Al 0.5	Th1 (°C)  ug Sep 11 0.79  Table 9c) 1 20.97	Oct 0.97	Nov 1	Dec 1	21	(85)
7. Mea Tempe Utilisat (86)m= Mean (87)m=	erature tion factor Jan 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nal temper during he tor for ga Feb 1 I tempera	erature eating p ains for I Mar 0.99 ature in	(heating eriods ir iving are 0.96 living are 20.78	season the livi ea, h1,m May 0.84 ea T1 (fo	527 ) ng ar (see Ju 0.6 ollow 20.9	ea from Tall Table 9a) In Jul 2 0.46 Steps 3 to 299 21 Iling from Tall	Al 0.5	Th1 (°C)  ug Sep 1 0.79  able 9c) 1 20.97  9, Th2 (°C)	Oct 0.97	Nov 1	Dec 1	21	(85)
7. Mea Tempe Utilisat  (86)m=  Mean (87)m=  Tempe (88)m=	an interperature tion factor Jan 1 20.28 erature 20.29	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29	erature eating p ains for I Mar 0.99 eature in 20.55 eating p 20.3	(heating eriods ir iving are 0.96 living are 20.78 eriods ir 20.31	season the livi ea, h1,m May 0.84 ea T1 (fo 20.94 or rest of	527 ) ng ar (see Ju 0.6 0.6 collow 20.9 dwel 20.9	ea from Tall Table 9a) In Jul 2 0.46 Steps 3 to 399 21 Iling from Tall 32 20.32	Al 0.57 in T 2° able 9 20.	Th1 (°C)  ug Sep 1 0.79  able 9c) 1 20.97  9, Th2 (°C)	Oct 0.97	Nov 1 20.49	Dec 1 20.27	21	(85) (86) (87)
7. Mea Tempe Utilisat  (86)m=  Mean (87)m=  Tempe (88)m=	an interperature tion factor Jan 1 20.28 erature 20.29	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29	erature eating p ains for I Mar 0.99 eature in 20.55 eating p 20.3	(heating eriods ir iving are 0.96 living are 20.78 eriods ir 20.31	season the livi ea, h1,m May 0.84 ea T1 (fo 20.94 or rest of	527 ) ng ar (see Ju 0.6 0.6 collow 20.9 dwel 20.9	ea from Tal e Table 9a) un Jul 2 0.46 steps 3 to 7 99 21 ling from Ta 32 20.32 (see Table	Al 0.57 in T 2° able 9 20.	Th1 (°C)  ug Sep 1 0.79  Table 9c) 1 20.97 0, Th2 (°C) 32 20.32	Oct 0.97	Nov 1 20.49	Dec 1 20.27	21	(85) (86) (87)
7. Mea Tempe Utilisat  (86)m=  Mean (87)m=  Tempe (88)m=  Utilisat (89)m=	erature tion factor Jan 1 20.28 erature 20.29 tion factor 1	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29	erature eating p ains for I Mar 0.99 eature in 20.55 eating p 20.3 ains for I 0.99	crest of do	season the livi ea, h1,m May 0.84 ea T1 (for 20.94 or rest of 20.31 welling, 0.8	527 ) ng ar (see 0.6 0.6 collow 20.9 dwel 20.9 h2,m 0.5	ea from Tal e Table 9a) un Jul 2 0.46 steps 3 to 7 99 21 ling from Ta 32 20.32 (see Table 6 0.39	Al 0.5 7 in T 2 able 9 20. 9a) 0.4	Th1 (°C)  ug Sep 1 0.79  Table 9c) 1 20.97 0, Th2 (°C) 32 20.32	Oct 0.97 20.77 20.31	Nov 1 20.49 20.31	Dec 1 20.27 20.3	21	(85) (86) (87) (88)
7. Mea Tempe Utilisat  (86)m=  Mean (87)m=  Tempe (88)m=  Utilisat (89)m=	erature tion factor Jan 1 20.28 erature 20.29 tion factor 1	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29	erature eating p ains for I Mar 0.99 eature in 20.55 eating p 20.3 ains for I 0.99	crest of do	season the livi ea, h1,m May 0.84 ea T1 (for 20.94 or rest of 20.31 welling, 0.8	527 ) ng ar (see 0.6 0.6 collow 20.9 dwel 20.9 h2,m 0.5	ea from Tal     Table 9a)     In Jul	Al 0.5 7 in T 2 able 9 20. 9a) 0.4	Th1 (°C)  ug Sep 1 0.79  fable 9c) 1 20.97  9, Th2 (°C) 32 20.32  3 0.73  to 7 in Table	Oct 0.97 20.77 20.31	Nov 1 20.49 20.31	Dec 1 20.27 20.3	21	(85) (86) (87) (88)
7. Mea Tempe Utilisat (86)m=  Mean (87)m=  Tempe (88)m=  Utilisat (89)m=  Mean	erature Jan 1 interna 20.28 erature 20.29 tion fac	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29 tor for ga 1 I tempera	erature eating p ins for I Mar 0.99 ature in 20.55 eating p 20.3 ains for I 0.99 ature in	(heating eriods ir iving are 0.96 living are 20.78 eriods ir 20.31 rest of do 0.94 the rest	season the livi ea, h1,m May 0.84 ea T1 (for 20.94 ea rest of 20.31 welling, 0.8 of dwell	527 ) ng ar (see Ju 0.6 0.6 collow 20.9 dwel 20.9 h2,m 0.5 ing T	ea from Tal     Table 9a)     In Jul	Al 0.57 in T 2 20. 29a) 0.4 eps 3	Th1 (°C)  ug Sep 1 0.79  Table 9c) 1 20.97  0, Th2 (°C) 32 20.32  3 0.73  to 7 in Table 32 20.29	Oct 0.97 20.77 20.31 0.96 le 9c) 20.03	Nov 1 20.49 20.31	Dec 1 20.27 20.3 1 19.31	21	(85) (86) (87) (88) (89)
7. Mea Tempe Utilisat  (86)m=  Mean (87)m=  Tempe (88)m=  Utilisat (89)m=  Mean (90)m=	erature tion fac Jan 1 interna 20.28 erature 20.29 tion fac 1 interna 19.32	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29 tor for ga 1 I tempera 19.46	erature eating p ains for I Mar 0.99 eature in 1 20.55 eating p 20.3 ains for I 0.99 eature in 1 19.71	cheating eriods ir iving are 0.96 living are 20.78 eriods ir 20.31 rest of dro.94 the rest 20.04	season the livi ea, h1,m May 0.84 ea T1 (for 20.94 the rest of 20.31 welling, 0.8 of dwell 20.25	527 ) ng ar (see Ju 0.6 collow 20.9 dwel 20.9 h2,m 0.5 ing T 20.9	ea from Tal e Table 9a) In Jul 2 0.46 steps 3 to 7 32 20.32 (see Table 6 0.39 2 (follow steps 32 20.32)	Al 0.5 7 in T 2 able 9 20. 9a) 0.4 eps 3	Th1 (°C)  ug Sep 1 0.79  Table 9c) 1 20.97  0, Th2 (°C) 32 20.32  3 0.73  to 7 in Table 32 20.29	Oct 0.97 20.77 20.31 0.96 le 9c) 20.03	Nov 1 20.49 20.31 0.99	Dec 1 20.27 20.3 1 19.31		(85) (86) (87) (88) (89) (90)
7. Mea Tempe Utilisat (86)m=  Mean (87)m=  Tempe (88)m=  Utilisat (89)m=  Mean (90)m=	erature tion fac Jan 1 interna 20.28 erature 20.29 tion fac 1 interna 19.32	nal temper during he tor for ga Feb 1 I tempera 20.38 during he 20.29 tor for ga 1 I tempera 19.46	erature eating p ains for I Mar 0.99 eature in 1 20.55 eating p 20.3 ains for I 0.99 eature in 1 19.71	cheating eriods ir iving are 0.96 living are 20.78 eriods ir 20.31 rest of dro.94 the rest 20.04	season the livi ea, h1,m May 0.84 ea T1 (for 20.94 the rest of 20.31 welling, 0.8 of dwell 20.25	527 ) ng ar (see Ju 0.6 collow 20.9 dwel 20.9 h2,m 0.5 ing T 20.9	ea from Tal Table 9a) In Jul 12 0.46 Steps 3 to 13 13 20.32  (see Table 6 0.39  2 (follow steps 32 20.32)  = fLA × T1	Al 0.5 7 in T 2 able 9 20. 9a) 0.4 eps 3	Th1 (°C)  ug Sep 1 0.79  fable 9c) 1 20.97  0, Th2 (°C) 32 20.32  3 0.73  to 7 in Tab 32 20.29  — fLA) × T2	Oct 0.97 20.77 20.31 0.96 le 9c) 20.03	Nov 1 20.49 20.31 0.99	Dec 1 20.27 20.3 1 19.31		(85) (86) (87) (88) (89) (90)

Result	s and in	outs info	ormed by	/ develo <sub>l</sub>	per decla	aration. I	Any devi	iation is	certain t	o output	differen	t results.		
(93)m=	19.52	19.64	19.86	20.16	20.35	20.41	20.41	20.41	20.39	20.15	19.79	19.5		(93)
8. Sp	ace heat	ting requ	uirement											
						ed at ste	ep 11 of	Table 9l	b, so tha	nt Ti,m=(	76)m an	d re-calc	ulate	
the ut	tilisation			<del>_</del> _		_	ı	Ι.	I -	<u> </u>			1	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	I	
	ation fact		i							1			ı	
(94)m=	1	0.99	0.98	0.94	0.8	0.57	0.4	0.44	0.74	0.96	0.99	1	I	(94)
	ıl gains,		· `	r `	r –		1	1	1	,	т		ı	
(95)m=	398.78	430.09	460.25	477.32	429.8	300.82	198.76	208.38	317.91	379.54	377.83	382.15	I	(95)
Montl	hly avera	ige exte	rnal tem	perature	e from Ta	able 8					,	, ,	1	
(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	for mea	an intern	al tempe	erature, l	_m , W =	=[(39)m	x [(93)m	– (96)m	]			1	
(97)m=	828.44	799.88	722.68	598.98	458.65	302.97	198.89	208.66	330.03	506.24	677.41	822.24		(97)
Space	e heating	g require	ement fo	r each n	nonth, k\	Vh/mon	th = 0.02	24 x [(97	)m – (95	5)m] x (4	1)m			
(98)m=	319.67	248.5	195.25	87.6	21.46	0	0	0	0	94.26	215.7	327.43		
					•		•	Tota	l per year	(kWh/yea	r) = Sum(9	18) <sub>15,912</sub> =	1509.87	(98)
Space	e heating	a roquir	omont in	k\\/h/m2	2/voor							[	20.04	     (99)
	`	•										l	20.94	(99)
9a. En	ergy req	uiremer	nts – Indi	ividual h	eating sy	/stems i	ncluding	micro-C	CHP)					
•	e heatin	•												_
Fracti	ion of sp	ace hea	at from so	econdar	y/supple	mentary	system						0	(201
Fracti	ion of sp	ace hea	at from m	nain syst	tem(s)			(202) = 1	- (201) <b>=</b>				1	(202
Fracti	ion of tot	al heati	ng from	main sy	stem 1			(204) = (2	02) × [1 –	(203)] =		i	1	(204
	ency of n		•	•								l I	90.3	(206
	•	-		•			0.4					ļ		╡`
Efficie	ency of s	econda	ry/suppl	ementar 	y heating	g system	า, % 						0	(208
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Space	e heating	g require	ement (c	alculate	d above)									
	319.67	248.5	195.25	87.6	21.46	0	0	0	0	94.26	215.7	327.43		
(211)m	n = {[(98)	m x (20	(4)] } x 1	00 ÷ (20	 )6)		•	•		•	•			(211
(= : : )::	354.01	275.2	216.22	97.01	23.77	0	0	0	0	104.39	238.87	362.6		•
						-	<u> </u>		l (kWh/yea				1672.06	(211
_								1010	(1.001111) 0.0	ar) – <b>G</b> arri(1	- 1 1 1 5,10 12	2	1072.00	(~
•	e heating	• '		• •	month									
	)m x (20		<u> </u>	r									1	
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		_
								Tota	ıl (kWh/yea	ar) =Sum(	215) <sub>15,101</sub>	2=	0	(215
Water	heating													
Output	from wa	ater hea	ter (calc	ulated a	bove)							, ,	1	
	194.49	169.89	176.76	156.77	151.79	133.68	128.08	142.78	144.36	164.38	175.47	189.92		_
Efficie	ncy of wa	ater hea	iter										81	(216
(217)m=	86.54	86.28	85.63	84.1	82.05	81	81	81	81	84.16	85.88	86.65		(217
Fuel fo	r water l	neating.	kWh/ma	onth			•	•	•	•	•			
	$\frac{1}{1} = \frac{(64)}{1}$	•												
` '	224.73	196.91	206.42	186.4	185	165.04	158.12	176.27	178.22	195.32	204.33	219.18		
				•	•			Tota	I = Sum(2	19a) <sub>112</sub> =	•	•	2295.95	(219
Annua	al totals										Wh/yeaı	r 1	kWh/year	<b>」</b> `
	heating	fuel use	ed, main	system	1						<i>a</i> y Oai	· [	1672.06	7
•	3		•	•								l		

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

rtodate and inpute informed by developer declare		,			
Water heating fuel used				2295.95	]
Electricity for pumps, fans and electric keep-hot					_
mechanical ventilation - balanced, extract or pos	sitive input from outside		175.96		(230a)
central heating pump:			30		(230c)
Total electricity for the above, kWh/year	sum of (23	30a)(230g) =		205.96	(231)
Electricity for lighting				325.57	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =		ĺ	4499.54	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	<b>Energy</b> kWh/year	Emission fac kg CO2/kWh	ctor	Emissions kg CO2/yea	ır
Space heating (main system 1)			etor =		ı <b>r</b> ](261)
Space heating (main system 1) Space heating (secondary)	kWh/year	kg CO2/kWh	,	kg CO2/yea	-
	kWh/year (211) x	kg CO2/kWh	=	kg CO2/yea	(261)
Space heating (secondary)	kWh/year (211) x (215) x	0.216 0.519 0.216	=	kg CO2/yea	(261) (263)
Space heating (secondary) Water heating	kWh/year (211) x (215) x (219) x	0.216 0.519 0.216	=	361.17 0 495.92	(261) (263) (264)
Space heating (secondary) Water heating Space and water heating	kWh/year (211) x (215) x (219) x (261) + (262) + (263) + (264) =	kg CO2/kWh  0.216  0.519  0.216	=	kg CO2/yea 361.17 0 495.92 857.09	(261) (263) (264) (265)
Space heating (secondary) Water heating Space and water heating Electricity for pumps, fans and electric keep-hot	kWh/year  (211) x  (215) x  (219) x  (261) + (262) + (263) + (264) =  (231) x  (232) x	kg CO2/kWh  0.216  0.519  0.519	=	kg CO2/yea 361.17 0 495.92 857.09 106.89	(261) (263) (264) (265) (267)

El rating (section 14)

(274)

## **Regulations Compliance Report**

Results and inputs informed by developer declaration. Any deviation is certain to output different results.

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.16 Printed on 03 August 2022 at 12:20:06

Project Information:

Assessed By: Robyn Berry (STRO036659) Building Type: Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE**Total Floor Area: 49.44m<sup>2</sup>

Site Reference: BP Finchley Road Plot Reference: G02 BP Finchley Rd

Address: G02 BP Finchley Rd, London, NW3 5EY

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

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.65 kg/m<sup>2</sup>

Dwelling Carbon Dioxide Emission Rate (DER) 15.80 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 47.1 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 33.7 kWh/m²

OK
2 Fabric U-values

Element Average Highest

External wall 0.14 (max. 0.30) 0.15 (max. 0.70) OK
Party wall 0.00 (max. 0.20) - OK
Floor 0.10 (max. 0.25) 0.10 (max. 0.70) OK

Roof (no roof)

Openings 0.95 (max. 2.00) 1.20 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Boiler systems with radiators or underfloor heating - mains gas

Data from manufacturer

Combi boiler

Efficiency 89.5 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

N/A

OK

Regulations Compliance Report
Results and inputs informed by developer declaration. Any deviation is certain to output different results.

6 Controls			
Space heating controls  Hot water controls:	TTZC by plumbing and e No cylinder thermostat No cylinder	lectrical services	ок
Boiler interlock:	Yes		ОК
7 Low energy lights			
Percentage of fixed lights wit Minimum	h low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra Specific fan power:	ct system	0.63	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames va Based on:	ılley):	Medium	OK
Overshading:		Average or unknown	
Windows facing: South West		6.65m²	
Windows facing: South East		3.04m²	
Ventilation rate:		2.00	
Blinds/curtains:		None	
10 Key features			
Air permeablility		3.0 m³/m²h	
Windows U-value		0.9 W/m²K	
Party Walls U-value		0 W/m <sup>2</sup> K	
Floors U-value		0.1 W/m <sup>2</sup> K	