### **Regulations Compliance Report**

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.8 Printed on 07 October 2020 at 14:39:50

Project Information:

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

Flat

Dwelling Details:

**NEW DWELLING DESIGN STAGE** 

Total Floor Area: 71.94m<sup>2</sup>

Site Reference : COPPETTS WOOD, London **Plot Reference:** Unit 10 - COPPETTS WOOD, Lo

Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas (c), Mains gas (c)

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

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

Dwelling Carbon Dioxide Emission Rate (DER) 12.44 kg/m<sup>2</sup> OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 58.2 kWh/m<sup>2</sup>

Dwelling Fabric Energy Efficiency (DFEE) 53.1 kWh/m<sup>2</sup>

OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.13 (max. 0.25)	0.13 (max. 0.70)	OK
Roof	(no roof)		
Openings	0.90 (max. 2.00)	0.90 (max. 3.30)	OK

2a Thermal bridging

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

3 Air permeability

Air permeability at 50 pascals 5.00 (design value)

OK Maximum 10.0

4 Heating efficiency

Main Heating system: Community heating schemes - mains gas

Community boilers

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

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

programmer and at least two room thermostats

Hot water controls: No cylinder thermostat

No cylinder

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

OK

# **Regulations Compliance Report**

7 Low energy lights		
Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK
8 Mechanical ventilation		
Continuous supply and extract system		
Specific fan power:	0.9	
Maximum	1.5	OK
MVHR efficiency:	91%	
Minimum	70%	OK
9 Summertime temperature		
Overheating risk (Thames valley):	Medium	OK
Based on:		
Overshading:	Average or unknown	
Windows facing: North	21.28m²	
Windows facing: West	4.52m²	
Ventilation rate:	4.00	
10 Key features		
Windows U-value	0.9 W/m²K	
Community heating, heat from boilers – mains gas		
Photovoltaic array		

## **Thermal Bridge Report**

Property Details: Unit 10 - COPPETTS WOOD, London

Address:

Located in: England Region: Thames valley

Thermal bridges:

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

### **Predicted Energy Assessment**



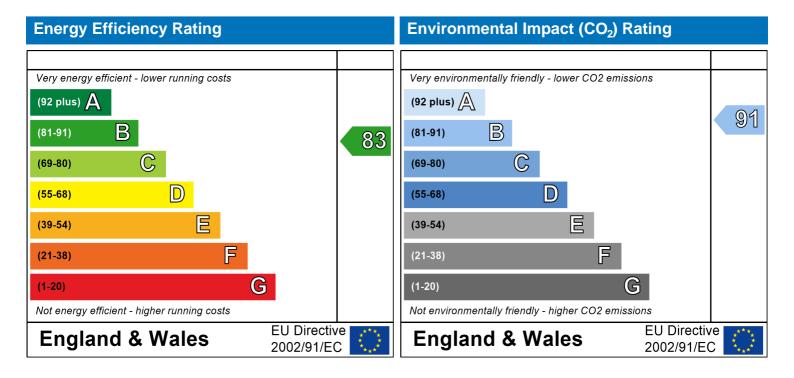
Dwelling type:
Date of assessment:
Produced by:

Mid floor Flat 30 September 2020 John Ashe

Produced by: John Ash Total floor area: 71.94 m<sup>2</sup>

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

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



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

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

### **Developer Confirmation Report**

### Property Details: Unit 10 - COPPETTS WOOD, London

Address:

Located in: England Region: Thames valley

UPRN:

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

Assessment type: New dwelling design stage

Transaction type: New dwelling
Thermal Mass Parameter: Indicative Value Low

Comments:

#### Property description:

Dwelling type: Flat

Detachment:

Year Completed: 2020 Front of dwelling faces: North

Comments:

### Opening types:

Name: Type: Frame Factor: U-Value: Area: g-value: Rear Windows Windows 0.7 0.63 0.9 21.28 Left Windows Windows 0.7 0.63 4.52 0.9

Overshading: Average or unknown

Comments:

### Opaque Elements:

Type: U-Value: Kappa:

**External Elements** 

Walls

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

N/A

Exposed Floor

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

N/A

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

### Thermal bridges:

# **Developer Confirmation Report**

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

# **Developer Confirmation Report**

Water heating:	
Water heating: Comments:	No hot water cylinder
	Calar repel False
Othors	Solar panel: False
Others:	
Electricity tariff:	Standard Tariff
Low energy lights:	100%
Terrain type:	Low rise urban / suburban
Wind turbine:	No
Photovoltaics:	Photovoltaic 1
	Installed Peak power: 0.8128501 Tilt of collector: 30°
	Overshading: None or very little
	Collector Orientation: South
Comments:	Collector Chemium. Count
Please provide the MCS certificate or	data sheet equivalent confirming the size of the array on the roof. This should
include any calculations to support a	proportioned amount included in the assessment.
<b>5</b>	
Declaration:	
I confirm that the property has been bu	uilt to the above specification.
Signed:	
Nate·	

User Details: **Assessor Name:** John Ashe Stroma Number: STRO031268 Stroma FSAP 2012 **Software Version: Software Name:** Version: 1.0.5.8 Property Address: Unit 10 - COPPETTS WOOD, London Address: 1. Overall dwelling dimensions Area(m²) Av. Height(m) Volume(m³) Ground floor (1a) x (2a) = 191.36 (3a) 71.94 2.66 Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+....(1n)(4)71.94 Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+....(3n) =191.36 (5) total main secondary other m³ per hour heating heating x 40 =Number of chimneys (6a) 0 0 x 20 =Number of open flues 0 O O 0 0 (6b) Number of intermittent fans x 10 =(7a) 0 0 x 10 =Number of passive vents (7b) 0 0 x 40 =Number of flueless gas fires (7c)Air changes per hour Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = $\div$  (5) = (8) If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) (9) O Additional infiltration (10)[(9)-1]x0.1 =0 Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction (11)0 if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0 0 (12) If no draught lobby, enter 0.05, else enter 0 (13)O Percentage of windows and doors draught stripped (14)0 Window infiltration  $0.25 - [0.2 \times (14) \div 100] =$ 0 (15)Infiltration rate (8) + (10) + (11) + (12) + (13) + (15) =O (16)Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area (17)5 If based on air permeability value, then  $(18) = [(17) \div 20] + (8)$ , otherwise (18) = (16)0.25 (18)Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered (19)0  $(20) = 1 - [0.075 \times (19)] =$ Shelter factor (20)1  $(21) = (18) \times (20) =$ Infiltration rate incorporating shelter factor 0.25 (21)Infiltration rate modified for monthly wind speed Jan Feb Jul Sep Mar Apr Mav Jun Aug Oct Nov Dec Monthly average wind speed from Table 7 (22)m =5.1 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7 Wind Factor  $(22a)m = (22)m \div 4$ (22a)m 1.27 1.25 1.23 1.08 0.95 0.95 0.92 1 1.08 1.12 1.1 1.18

	ation rate (a	ıllowing	g for sh	elter an	d wind s	peed) =	(21a) x	(22a)m					
0.32		).31	0.28	0.27	0.24	0.24	0.23	0.25	0.27	0.28	0.29		
Calculate effect If mechanica		-	ite for ti	he applic	cable ca	se					ĺ	0.5	(23
If exhaust air he			dix N, (2	3b) = (23a	) × Fmv (e	equation (N	N5)) , other	wise (23b	) = (23a)			0.5	(23)
If balanced with				, ,	,	. `	,, .	,	, , ,			77.35	(23)
a) If balanced	•	•	•	ŭ		,	•		2h)m + ('	23h) 🗴 [	ا 1 <i>– (2</i> 3c)		(20
(24a)m= 0.43		0.42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41	. 100]	(24
b) If balance	L d mechanic	L cal ven	tilation	without	heat rec	coverv (N	<u>I</u> //∖/) (24b	)m = (22	2b)m + (2	L 23h)	ļ		
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole ho	use extrac	t venti	lation o	r positiv	e input v	rentilatio	n from c	utside			!		
,	$1 < 0.5 \times (23)$			•	•				5 × (23b	)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
d) If natural w	entilation o	or whol	le hous	e positiv	e input	ventilatio	on from I	oft				l	
if (22b)m	1 = 1, then (	(24d)m	n = (22b	)m othe	rwise (2	4d)m =	0.5 + [(2	2b)m² x	0.5]			ı	
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change rate	e - ente	er (24a	or (24b	o) or (24	c) or (24	d) in box	(25)			,	ı	
(25)m= 0.43	0.43 0	).42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41		(25
3. Heat losses	and heat l	oss na	aramete	zr.									
ELEMENT	Gross	·	Openin		Net Ar	ea	U-valı	IE	AXU		k-value		λΧk
	area (m²		m		A ,r		W/m2		(W/ł	<)	kJ/m²-l		J/K
Windows Type	1				21.28	x1,	/[1/( 0.9 )+	0.04] =	18.49				(27
Windows Type	2				4.52	x1,	/[1/( 0.9 )+	0.04] =	3.93	=			(27
Floor					71.94	x	0.13	_ <u>-</u> i	9.3522	<b>=</b>			(28
Walls	57.64	7 [	25.8		31.84	x	0.15	╡┇	4.78	<b>=</b>		7 H	(29
Total area of el		_			129.5	=							` (31
* for windows and I	•		ective wii	ndow U-va			formula 1	/[(1/U-valu	ıe)+0.04] a	ıs given in	paragraph	3.2	(0.
** include the areas						J		-,	, -	Ū	, , ,		
Fabric heat loss	s, W/K = S	(A x U	J)				(26)(30)	+ (32) =				36.54	(33
Heat capacity 0	Cm = S(A x)	(k)						((28)	.(30) + (32	2) + (32a).	(32e) =	9823.8	(34
Thermal mass	parameter	(TMP :	= Cm ÷	TFA) in	kJ/m²K			Indica	tive Value:	Low		100	(35
For design assessi				constructi	on are not	t known pr	ecisely the	indicative	values of	TMP in T	able 1f		
	d of a detailed	d calcula	ation.			,							
	- 0 // \/	Λ 1 -	Tarta d									19.44	(36
Thermal bridge	`	,		• .	•	`						10.44	
Thermal bridge	l bridging are	,		• .	•	`		(33) +	(36) =				(37
Thermal bridge if details of thermal Total fabric hea	l bridging are a	not knov	wn (36) =	= 0.05 x (3	•	`			(36) = = 0.33 × (	25)m x (5	   	55.98	(37
Thermal bridge if details of thermal Total fabric hea  Ventilation hea	I bridging are and the loss the loss calcu	not knov	wn (36) = monthly	0.05 x (3	1)		Aug	(38)m	= 0.33 × (		1		(37
Thermal bridge if details of thermal Total fabric hea Ventilation hea	at loss t loss calcu	not knov ulated r Mar	wn (36) =	.: 0.05 x (3 / May	Jun	Jul	Aug 21.75	(38)m Sep	= 0.33 × (	Nov	Dec 25.7		
Thermal bridge if details of thermal Total fabric hea Ventilation hea  Jan (38)m= 27.28	I bridging are at loss t loss calcu Feb 1 26.89 26	not know ulated r Mar 6.49	wn (36) = monthly Apr	0.05 x (3	1)		Aug 21.75	(38)m Sep 22.94	= 0.33 × ( Oct 24.12	Nov 24.91	Dec		
Thermal bridge if details of thermal Total fabric hea Ventilation hea  Jan (38)m= 27.28  Heat transfer co	I bridging are at loss t loss calcu Feb N 26.89 26	not know ulated r Mar 6.49	wn (36) = monthly Apr 24.52	May 24.12	Jun 22.15	Jul 22.15	21.75	(38)m Sep 22.94 (39)m	$= 0.33 \times (0.0000000000000000000000000000000000$	Nov 24.91 38)m	Dec 25.7		
	I bridging are at loss t loss calcu Feb N 26.89 26	not know ulated r Mar 6.49	wn (36) = monthly Apr	.: 0.05 x (3 / May	Jun	Jul		(38)m Sep 22.94 (39)m 78.92	= 0.33 × (0.20	Nov 24.91 38)m 80.89	Dec 25.7	55.98	(38
Thermal bridge if details of thermal Total fabric hea Ventilation hea  Jan (38)m= 27.28  Heat transfer co	I bridging are at loss t loss calcu Feb N 26.89 26 0efficient, V 82.86 82	not known	monthly Apr 24.52	May 24.12	Jun 22.15	Jul 22.15	21.75	(38)m Sep 22.94 (39)m 78.92	$= 0.33 \times (0.0000000000000000000000000000000000$	Nov 24.91 38)m 80.89 Sum(39) <sub>1</sub>	Dec 25.7		
Thermal bridge  if details of thermal  Total fabric hea  Ventilation hea  Jan  (38)m= 27.28  Heat transfer co  (39)m= 83.26	I bridging are at loss It loss calcu Feb	not known	monthly Apr 24.52	May 24.12	Jun 22.15	Jul 22.15	21.75	(38)m Sep 22.94 (39)m 78.92	= 0.33 × (0 Oct 24.12 = (37) + (3 80.1 Average =	Nov 24.91 38)m 80.89 Sum(39) <sub>1</sub>	Dec 25.7	55.98	(38

Jul

Sep

Oct

Nov

Dec

Aug

Number of days in month (Table 1a) Feb

Jan

Mar

Apr

May

Jun

(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 occu if TFA > 13.9 if TFA £ 13.9	9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9	)2)] + 0.0	0013 x ( <sup>-</sup>	ΓFA -13.		29		(42)
Annual averag Reduce the annua not more that 125	al average	hot water	usage by	5% if the c	lwelling is	designed t			se target o		3.64		(43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage i	n litres pei	r day for ea	ach month	Vd,m = fa	ctor from T	Table 1c x	(43)		•				
(44)m= 97.51	93.96	90.41	86.87	83.32	79.78	79.78	83.32	86.87	90.41	93.96	97.51		<b>–</b>
Energy content of	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		1063.7	(44)
(45)m= 144.6	126.47	130.5	113.78	109.17	94.21	87.3	100.17	101.37	118.14	128.95	140.04		_
If instantaneous w	/ater heati	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		Total = Su	m(45) <sub>112</sub> =	=	1394.68	(45)
(46)m= 21.69	18.97	19.58	17.07	16.38	14.13	13.09	15.03	15.21	17.72	19.34	21.01		(46)
Water storage		. in aludin	.a. opv. o	olor or M	WALDO	otorogo	within o	ama vaa	ool			· 	(47)
Storage volum  If community h	, ,		•			•		allie ves	Sei		0		(47)
Otherwise if no Water storage	stored			_			, ,	ers) ente	er '0' in (	47)			
a) If manufact		eclared I	oss facto	or is kno	wn (kWh	n/day):					0		(48)
Temperature f	actor fro	m Table	2b								0		(49)
Energy lost fro		_	-				(48) x (49)	) =		1	10		(50)
b) If manufact Hot water stor	age loss	factor fr	om Tabl							0.	02		(51)
If community he Volume factor	•		on 4.3									1	<b>(</b> EQ)
Temperature f			2b								.6		(52) (53)
Energy lost fro				ear			(47) x (51)	) x (52) x (	53) =		.03		(54)
Enter (50) or		_	•							-	03		(55)
Water storage	loss cal	culated t	for each	month			((56)m = (	55) × (41)ı	m				
(56)m= 32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinder contains	s dedicate	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (	H11)] ÷ (5	0), else (5	7)m = (56)	m where (	H11) is fro	m Append	ix H	
(57)m= 32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Primary circuit	loss (ar	nual) fro	m Table	3							0		(58)
Primary circuit				,	•	. ,	, ,						
(modified by							<del></del>			<del></del>	00.00		(FO)
(59)m= 23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi loss ca		<del> </del>	<del></del>	<del>`                                    </del>	<del>` ´                                     </del>	<del></del>				_		l	(04)
(61)m= 0	0	0	0	0	0	0	0	0	0	0	0		(61)

19.88   176.39   18.78   167.27   164.45   147.7   142.57   156.45   154.86   173.41   182.45   195.31	Total heat required for wate	r heating o	calculated	I for ead	ch month	(62)m	$1 = 0.85 \times 0$	(45)m +	- (46)m +	(57)m +	(59)m + (61)m	
Company   Comp	(62)m= 199.88 176.39 185.	78 167.27	164.45	147.7	142.57	155.4	5 154.86	173.41	182.45	195.31		(62)
Coling	Solar DHW input calculated using	Appendix G	or Appendix	H (nega	tive quantity	y) (ente	'0' if no sola	r contribu	ution to wate	er heating)		
Output from water heater  (64)ms 199.86 176.39 185.76 167.27 164.45 147.7 142.57 155.45 154.86 173.41 182.45 195.31  Output from water heater (annual) 2045.52 [64]  Heat gains from water heating, kWh/month 0.25 ' [0.85 x (45)m + (61)m] + 0.8 x ((46)m + (57)m + (57)m + (59)m]  (65)ms 92.3 81.99 87.61 80.63 80.62 74.12 73.25 77.53 76.5 83.5 86.67 90.78 (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 53):  Metabolic gains (Table 5), Watts  Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m (66)m (73.74 137.54	(add additional lines if FGH	रS and/or	WWHRS	applies	s, see Ap	pendi	( G)		_		•	
Gelima   1998.8   176.39   185.78   185.78   167.27   164.45   147.7   142.57   155.45   154.86   173.41   182.45   195.31	(63)m= 0 0 0	0	0	0	0	0	0	0	0	0		(63)
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]	Output from water heater										_	
Heat gains from water besting, kWh/morth 0.25 * [0.85 x (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m] (65)m = 92.3	(64)m= 199.88 176.39 185.	78 167.27	164.45	147.7	142.57	155.4	5 154.86	173.41	182.45	195.31		_
(65)m    92.3   81.99   87.61   80.63   80.52   74.12   73.25   77.53   76.5   83.5   85.67   90.78   (65)     Include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating    Secondary   Include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating    Secondary   Include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating    Secondary   Include						O	utput from wa	ater heat	er (annual)₁	12	2045.52	(64)
Include (67)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating	Heat gains from water heati	ng, kWh/n	nonth 0.2	5 ´ [0.8	5 × (45)m	+ (61	)m] + 0.8 x	(46)m	n + (57)m	+ (59)m	]	
Metabolic gains (Table 5), Watts   Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec   Nov   Dec   Nov   Dec   Nov   Dec   Nov	(65)m= 92.3 81.99 87.6	1 80.63	80.52	74.12	73.25	77.53	76.5	83.5	85.67	90.78		(65)
Metabolic gains (Table 5), Watts    Jan	include (57)m in calculation	on of (65)r	n only if c	ylinder	is in the	dwellir	ng or hot w	ater is	from com	munity h	eating	
Second   Feb   Mar   Apr   May   Jun   Jun   Aug   Sep   Oct   Nov   Dec   Recommendation	5. Internal gains (see Tab	e 5 and 5	a):									
Cooking gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	Metabolic gains (Table 5), V	Vatts									_	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 (67)m=   44.97   39.94   32.48   24.59   18.38   15.52   16.77   21.8   29.26   37.15   43.36   46.22   (67)  Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 (68)m=   301.17   304.29   296.42   279.65   258.49   238.6   225.31   222.18   230.06   246.82   267.99   287.88   (68)  Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 (69)m=   51.05	Jan Feb Ma	ar Apr	May	Jun	Jul	Au	g Sep	Oct	Nov	Dec		
(67)me	(66)m= 137.54 137.54 137.	54 137.54	137.54	137.54	137.54	137.5	4 137.54	137.54	137.54	137.54		(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 (68)m= 301.17 304.29 296.42 279.65 258.49 238.6 225.31 222.18 230.06 246.82 267.99 287.88 (68)  Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 (69)m= 51.05 51	Lighting gains (calculated in	Appendix	L, equat	ion L9 d	or L9a), a	lso se	e Table 5	-		-		
(68) ms   301.17   304.29   296.42   279.65   258.49   238.6   225.31   222.18   230.06   246.82   267.99   287.88   (68)   Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5   (69) ms   51.05	(67)m= 44.97 39.94 32.4	8 24.59	18.38	15.52	16.77	21.8	29.26	37.15	43.36	46.22		(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5  (69)m= 51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05   51.05    Pumps and fans gains (Table 5a)  (70)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Appliances gains (calculate	in Apper	ndix L, eq	uation I	_13 or L1	3a), a	so see Tal	ble 5			•	
(69)m=   51.05   51.	(68)m= 301.17 304.29 296.	12 279.65	258.49	238.6	225.31	222.1	8 230.06	246.82	267.99	287.88		(68)
Pumps and fans gains (Table 5a)  (70)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cooking gains (calculated in	Appendi:	ι L, equat	ion L15	or L15a	), also	see Table	5	•	•	•	
Colored   Colo	(69)m= 51.05 51.05 51.0	5 51.05	51.05	51.05	51.05	51.0	5 51.05	51.05	51.05	51.05		(69)
Losses e.g. evaporation (negative values) (Table 5) (71)m=	Pumps and fans gains (Tab	le 5a)	•		•		•		•			
(71)m=         -91.69	(70)m= 0 0 0	0	0	0	0	0	0	0	0	0		(70)
Water heating gains (Table 5)  (72)m= 124.06	Losses e.g. evaporation (ne	gative val	ues) (Tab	le 5)	•	•	•		•	•		
Total internal gains =	(71)m= -91.69 -91.69 -91.	9 -91.69	-91.69	-91.69	-91.69	-91.6	9 -91.69	-91.69	-91.69	-91.69		(71)
Total internal gains =	Water heating gains (Table	5)	•	•	•	•	•		•	•		
(73)m= 567.09 563.14 543.55 513.12 481.99 453.95 437.42 445.08 462.46 493.1 527.23 553.01 (73)  6. Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.  Orientation: Access Factor Table 6d m² Table 6a Table 6b Table 6c (W)  North 0.9x 0.77 x 21.28 x 10.63 x 0.63 x 0.7 = 69.15 (74)  North 0.9x 0.77 x 21.28 x 20.32 x 0.63 x 0.7 = 132.16 (74)  North 0.9x 0.77 x 21.28 x 34.53 x 0.63 x 0.7 = 224.57 (74)  North 0.9x 0.77 x 21.28 x 34.53 x 0.63 x 0.7 = 360.71 (74)  North 0.9x 0.77 x 21.28 x 74.72 x 0.63 x 0.7 = 360.71 (74)  North 0.9x 0.77 x 21.28 x 74.72 x 0.63 x 0.7 = 485.91 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 74.68 x 0.63 x 0.7 = 520.18 (74)	(72)m= 124.06 122.01 117.	76 111.98	108.23	102.94	98.45	104.2	1 106.25	112.23	118.99	122.02		(72)
6. Solar gains:  Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.  Orientation: Access Factor Table 6d Table 6a Table 6b Table 6c (W)  North 0.9x 0.77 x 21.28 x 10.63 x 0.63 x 0.7 = 69.15 (74)  North 0.9x 0.77 x 21.28 x 20.32 x 0.63 x 0.7 = 132.16 (74)  North 0.9x 0.77 x 21.28 x 34.53 x 0.63 x 0.7 = 224.57 (74)  North 0.9x 0.77 x 21.28 x 55.46 x 0.63 x 0.7 = 360.71 (74)  North 0.9x 0.77 x 21.28 x 74.72 x 0.63 x 0.7 = 485.91 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 485.65 (74)	Total internal gains =		•	(66	6)m + (67)m	n + (68)	m + (69)m + (	(70)m + (	71)m + (72)	m		
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         Table 6b         FF Table 6c         Gains (W)           North         0.9x         0.77         x         21.28         x         10.63         x         0.63         x         0.7         =         69.15         (74)           North         0.9x         0.77         x         21.28         x         20.32         x         0.63         x         0.7         =         132.16         (74)           North         0.9x         0.77         x         21.28         x         34.53         x         0.63         x         0.7         =         224.57         (74)           North         0.9x         0.77         x         21.28         x         55.46         x         0.63         x         0.7         =         360.71         (74)           North         0.9x         0.77         x         21.28         x         74.72         x         0.63         x         0.7         =         485.91         (74)           North         0.9x         0.77	(73)m= 567.09 563.14 543.	55 513.12	481.99	453.95	437.42	445.0	8 462.46	493.1	527.23	553.01		(73)
Orientation:         Access Factor Table 6d         Area m²         Flux Table 6a $g_{-}$ Table 6b         FF Table 6c         Gains (W)           North         0.9x         0.77         x         21.28         x         10.63         x         0.63         x         0.7         =         69.15         (74)           North         0.9x         0.77         x         21.28         x         20.32         x         0.63         x         0.7         =         132.16         (74)           North         0.9x         0.77         x         21.28         x         34.53         x         0.63         x         0.7         =         224.57         (74)           North         0.9x         0.77         x         21.28         x         55.46         x         0.63         x         0.7         =         360.71         (74)           North         0.9x         0.77         x         21.28         x         74.72         x         0.63         x         0.7         =         485.91         (74)           North         0.9x         0.77         x         21.28         x         79.99         x         0.63         x         <	6. Solar gains:											
North         0.9x         0.77         x         21.28         x         10.63         x         0.63         x         0.7         =         69.15         (74)           North         0.9x         0.77         x         21.28         x         20.32         x         0.63         x         0.7         =         132.16         (74)           North         0.9x         0.77         x         21.28         x         34.53         x         0.63         x         0.7         =         224.57         (74)           North         0.9x         0.77         x         21.28         x         55.46         x         0.63         x         0.7         =         360.71         (74)           North         0.9x         0.77         x         21.28         x         74.72         x         0.63         x         0.7         =         485.91         (74)           North         0.9x         0.77         x         21.28         x         79.99         x         0.63         x         0.7         =         520.18         (74)           North         0.9x         0.77         x         21.28         x	Solar gains are calculated using	olar flux fror	n Table 6a	and asso	ciated equa	ations to	convert to th	e applica	able orientat	ion.		
North								_				
North	Table 6d	m²		la	able 6a		Table 6b		l able 6c		(W)	
North	North 0.9x 0.77	x 2	1.28	x	10.63	] x [	0.63	x [	0.7	=	69.15	(74)
North 0.9x 0.77 x 21.28 x 55.46 x 0.63 x 0.7 = 360.71 (74)  North 0.9x 0.77 x 21.28 x 74.72 x 0.63 x 0.7 = 485.91 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 74.68 x 0.63 x 0.7 = 485.65 (74)	North 0.9x 0.77	x 2	1.28	X	20.32	x [	0.63	x	0.7	=	132.16	(74)
North 0.9x 0.77 x 21.28 x 74.72 x 0.63 x 0.7 = 485.91 (74)  North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 74.68 x 0.63 x 0.7 = 485.65 (74)	North 0.9x 0.77	x 2	1.28	X	34.53	x [	0.63	x [	0.7	=	224.57	(74)
North 0.9x 0.77 x 21.28 x 79.99 x 0.63 x 0.7 = 520.18 (74)  North 0.9x 0.77 x 21.28 x 74.68 x 0.63 x 0.7 = 485.65 (74)	North 0.9x 0.77	x 2	1.28	x	55.46	x [	0.63	x [	0.7	=	360.71	(74)
North 0.9x 0.77 x 21.28 x 74.68 x 0.63 x 0.7 = 485.65 (74)	North 0.9x 0.77	x 2	1.28	x	74.72	] x	0.63	x	0.7	=	485.91	(74)
1	North 0.9x 0.77	x 2	1.28	X	79.99	] x [	0.63	x [	0.7		520.18	(74)
North 0.9x 0.77 x 21.28 x 50.25 x 0.62 x 0.7 = 325.21 (74)	North 0.9x 0.77	x 2	1.28	X	74.68	] x [	0.63	x [	0.7	=	485.65	(74)
0.5% 0.77	North 0.9x 0.77	x 2	1.28	x	59.25	x	0.63	x	0.7	=	385.31	(74)

North	0.9x	0.77	Х	21.	.28	X	4	11.52	X	0.63	X	0.7	=	270	(74)
North	0.9x	0.77	X	21.	.28	x	2	24.19	X	0.63	x	0.7	=	157.31	(74)
North	0.9x	0.77	X	21.	.28	x	1	13.12	X	0.63	X	0.7	=	85.31	(74)
North	0.9x	0.77	X	21.	.28	x		8.86	X	0.63	X	0.7	=	57.65	(74)
West	0.9x	0.77	X	4.5	52	x	1	19.64	X	0.63	x	0.7	=	27.13	(80)
West	0.9x	0.77	X	4.	52	x	3	38.42	X	0.63	x	0.7	=	53.07	(80)
West	0.9x	0.77	Х	4.9	52	X	6	3.27	X	0.63	х	0.7	=	87.4	(80)
West	0.9x	0.77	X	4.	52	x	9	92.28	X	0.63	x	0.7	=	127.47	(80)
West	0.9x	0.77	X	4.	52	x	1	13.09	X	0.63	x	0.7	=	156.22	(80)
West	0.9x	0.77	X	4.	52	x	1	15.77	x	0.63	x	0.7	=	159.92	(80)
West	0.9x	0.77	X	4.	52	x	1	10.22	X	0.63	x	0.7	=	152.25	(80)
West	0.9x	0.77	х	4.	52	x	9	94.68	X	0.63	x	0.7	=	130.78	(80)
West	0.9x	0.77	x	4.	52	x	7	73.59	X	0.63	x	0.7	=	101.65	(80)
West	0.9x	0.77	X	4.	52	x	4	15.59	X	0.63	x	0.7	=	62.98	(80)
West	0.9x	0.77	х	4.5	52	x	2	24.49	X	0.63	x	0.7	=	33.83	(80)
West	0.9x	0.77	x	4.5	52	x	1	16.15	X	0.63	x	0.7	=	22.31	(80)
Solar gair	ns in	watts. ca	alculated	for eac	h mont	h			(83)m	n = Sum(74)m	(82)m				
<b>—</b>	96.28	185.23	311.97	488.18	642.13	$\neg$	80.1	637.91	516		220.2	9 119.14	79.96	]	(83)
Total gair	ns – iı	nternal a	nd sola	r (84)m :	= (73)m	1 + (	83)m	, watts			l	-1	ļ	ı	
(84)m= 66	63.38	748.37	855.52	1001.3	1124.1	2 11	134.05	1075.33	961	.17 834.11	713.3	9 646.37	632.97	]	(84)
7 Mean	inter	nal temn	erature	(heating	1 56350	n)		ı	L		ı			•	
7. Mean							area :	from Tak	مام ۵	Th1 (°C)				21	(85)
Tempera	ature	during h	eating p	eriods i	n the liv	/ing			ole 9	, Th1 (°C)				21	(85)
Tempera	ature on fac	during h	eating pains for	eriods i	n the live ea, h1,	/ing m (s	ее Та	able 9a)			Oct	Nov	Doc	21	(85)
Tempera Utilisatio	ature on fac Jan	during h tor for ga	eating pains for	eriods i living ard Apr	n the livea, h1,r	/ing m (s	ee Ta Jun	able 9a) Jul	Α	ug Sep	Oct	+	Dec	21	
Tempera Utilisatio	ature on fac Jan <sup>0.92</sup>	during heter for garage	neating pains for Mar	eriods i living ar Apr 0.72	n the livea, h1,r May	ving m (s	ee Ta Jun <sup>0.41</sup>	Jul 0.31	0.3	ug Sep 36 0.56	Oct 0.78	Nov 0.89	Dec 0.93	21	(85)
Tempera Utilisatio	ature on fac Jan <sup>0.92</sup> iterna	during heter for garage Feb 0.89	neating pains for Mar 0.83	periods in living are Apr 0.72 living ar	n the livea, h1,r May 0.57	ving m (s	ee Ta Jun <sup>0.41</sup> ow ste	ble 9a)  Jul  0.31  ps 3 to 7	0.3 7 in T	ug Sep 36 0.56 able 9c)	0.78	0.89		21	(86)
Tempera Utilisatio	ature on fac Jan <sup>0.92</sup>	during heter for garage	neating pains for Mar	eriods i living ar Apr 0.72	n the livea, h1,r May	ving m (s	ee Ta Jun <sup>0.41</sup>	Jul 0.31	0.3	ug Sep 36 0.56 able 9c)		0.89		21	
Tempera Utilisatio (86)m= (  Mean in (87)m= 1	ature on fac Jan 0.92 oterna 19.06	during heter for garage feb 0.89 I temper 19.34	neating pains for Mar 0.83 ature in 19.79	living are 0.72 living ar 20.36	n the livea, h1,r May 0.57 ea T1 (	ring m (s r	Jun 0.41 ow ste	Jul 0.31 ps 3 to 7 20.97	A 0.37 in T 20.	ug Sep 36 0.56 able 9c)	0.78	0.89	0.93	21	(86)
Tempera  Utilisatio  (86)m= (  Mean in (87)m= 1  Tempera	ature on fac Jan 0.92 oterna 19.06	during heter for garage feb 0.89 I temper 19.34	neating pains for Mar 0.83 ature in 19.79	living are 0.72 living ar 20.36	n the livea, h1,r May 0.57 ea T1 (	ring m (s r follo	Jun 0.41 ow ste	Jul 0.31 ps 3 to 7 20.97	A 0.37 in T 20.	ug Sep 36 0.56 Table 9c) 96 20.81 9, Th2 (°C)	0.78	0.89	0.93	21	(86)
Tempera  Utilisatio  (86)m= (  Mean in (87)m= 1  Tempera (88)m= 1	ature on fac Jan 0.92 aterna 19.06 ature 19.95	during heter for gase Feb 0.89 I temper 19.34 during heter 19.96	meating pains for Mar 0.83 ature in 19.79 meating pains 19.96	living are 0.72 living are 20.36 periods in 19.99	n the livea, h1,r May 0.57 ea T1 ( 20.73 n rest o	ring m (s	Jun 0.41 ow ste 20.92 velling	Jul 0.31  ps 3 to 7 20.97  from Ta 20.01	A 0.37 in T 20.	ug Sep 36 0.56 Table 9c) 96 20.81 9, Th2 (°C)	20.31	0.89	0.93	21	(86)
Tempera Utilisatio  (86)m= (  Mean in (87)m= 1  Tempera (88)m= 1  Utilisatio	ature on fac Jan 0.92 aterna 19.06 ature 19.95	during heter for gase Feb 0.89 I temper 19.34 during heter 19.96	meating pains for Mar 0.83 ature in 19.79 meating pains 19.96	living are 0.72 living are 20.36 periods in 19.99	n the livea, h1,r May 0.57 ea T1 ( 20.73 n rest o	ving m (s	Jun 0.41 ow ste 20.92 velling	Jul 0.31  ps 3 to 7 20.97  from Ta 20.01	A 0.37 in T 20.	ug Sep 36 0.56  Table 9c) 96 20.81  9, Th2 (°C) 02 20	20.31	0.89	0.93	21	(86)
Tempera Utilisatio  (86)m=  Mean in  (87)m=  1  Tempera  (88)m=  1  Utilisatio  (89)m=	ature on fac Jan 0.92 sterna 19.06 ature 19.95 on fac 0.91	during heter for gase sector f	neating pains for Mar 0.83 ature in 19.79 neating pains for 0.81	living are 0.72 living are 20.36 periods in 19.99 rest of discontinuous formal control of the co	n the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest o 19.99 welling 0.52	ving m (s	Jun 0.41  ow stee 20.92  velling 20.01  ,m (see	Jul 0.31  eps 3 to 7  20.97  g from Ta  20.01  ee Table  0.24	A 0.37 in T 20.42 able 9 20.42 9 a) 0.2	ug Sep 36 0.56 Table 9c) 96 20.81 9, Th2 (°C) 02 20	0.78 20.31 19.99	19.62	0.93 19.04 19.97	21	(86) (87) (88)
Tempera Utilisatio (86)m= (  Mean in (87)m= 1  Tempera (88)m= 1  Utilisatio (89)m= (  Mean in	ature on fac Jan 0.92 aterna 19.06 ature 19.95 on fac 0.91 aterna	during heter for gases to for gases to for gases temperature for gases to for gases	meating pains for Mar 0.83 ature in 19.79 meating pains for 0.81 ature in	living are 0.72 living are 20.36 periods in 19.99 rest of details the rest	n the lives, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 0.52 of dwe	ving m (s / / / / / / / / / / / / / / / / / /	ee Ta Jun 0.41  ow ste 20.92  velling 20.01  ,m (se 0.36	Jul 0.31 ps 3 to 7 20.97 from Ta 20.01 ee Table 0.24 ollow ste	A 0.37 in T 20.4 able 9 20.4 9a) 0.2 eps 3	ug Sep 36 0.56  Table 9c) 96 20.81  9, Th2 (°C) 02 20  29 0.5  to 7 in Tab	0.78 20.31 19.99	0.89 19.62 19.98 0.87	0.93 19.04 19.97	21	(86) (87) (88)
Tempera Utilisatio  (86)m=  Mean in  (87)m=  1  Tempera  (88)m=  1  Utilisatio  (89)m=  (Mean in	ature on fac Jan 0.92 sterna 19.06 ature 19.95 on fac 0.91	during heter for gase sector f	neating pains for Mar 0.83 ature in 19.79 neating pains for 0.81	living are 0.72 living are 20.36 periods in 19.99 rest of discontinuous formal control of the co	n the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest o 19.99 welling 0.52	ving m (s / / / / / / / / / / / / / / / / / /	Jun 0.41  ow stee 20.92  velling 20.01  ,m (see	Jul 0.31  eps 3 to 7  20.97  g from Ta  20.01  ee Table  0.24	A 0.37 in T 20.42 able 9 20.42 9 a) 0.2	ug Sep  36 0.56  Table 9c)  96 20.81  9, Th2 (°C)  02 20  29 0.5  1 to 7 in Tab  99 19.82	0.78 20.31 19.99 0.75 le 9c) 19.18	0.89 19.62 19.98 0.87	0.93 19.04 19.97 0.92		(86) (87) (88) (89)
Tempera Utilisatio  (86)m=  Mean in  (87)m=  1  Tempera  (88)m=  1  Utilisatio  (89)m=  Mean in  (90)m=  1	ature on fac Jan 0.92 aterna 19.06 ature 19.95 on fac 0.91 aterna 17.41	during heter for gase of the second s	neating pains for  Mar  0.83  ature in  19.79  neating pains for  0.81  ature in  18.44	living are 0.72 living are 20.36 periods in 19.99 rest of dot 0.68 the rest 19.22	n the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 welling 0.52 of dwe 19.7	ving m (s	ee Ta Jun 0.41  ow ste 20.92  velling 20.01  ,m (se 0.36  T2 (fe	Jul 0.31  ps 3 to 7 20.97  from Ta 20.01  ee Table 0.24  ollow ste	A 0.3 7 in T 20. 9a) 0.2 eps 3	ug Sep 36 0.56  Table 9c) 96 20.81  9, Th2 (°C) 02 20  29 0.5  1 to 7 in Tab 99 19.82	0.78  20.31  19.99  0.75  e 9c)  19.18  fLA = Liv	0.89 19.62 19.98 0.87	0.93 19.04 19.97 0.92	0.62	(86) (87) (88) (89)
Tempera Utilisatio  (86)m=  (86)m=  (87)m=  1  Tempera (88)m=  1  Utilisatio (89)m=  (89)m=  (90)m=  1  Mean in	ature on fac Jan 0.92 aterna 19.06 ature 19.95 on fac 0.91 aterna 17.41	during heter for gase sector f	meating pains for Mar 0.83 ature in 19.79 meating pains for 0.81 ature in 18.44 ature (for meating pains for 18.44	living are 0.72 living are 20.36 periods in 19.99 rest of derivative the rest 19.22 per the whole who will be the rest 19.22 per the whole who will be the rest the rest the rest the whole who will be the rest that the rest the whole who will be the rest that the r	m the lives, h1,1 May 0.57 ea T1 ( 20.73 m rest of 19.99 welling 0.52 of dwe 19.7	ving m (s / ifollo z ff dw z llling 1	ee Ta  Jun  0.41  ow ste  20.92  velling  20.01  ,m (se  0.36  T2 (fe  19.94	Jul 0.31 ps 3 to 7 20.97 from Ta 20.01 ee Table 0.24 ollow ste 20  LA × T1	A 0.3 7 in 1 20. able 9 20. 9a) 0.2 eps 3 19.	ug Sep  36 0.56  able 9c)  96 20.81  9, Th2 (°C)  02 20  29 0.5  1 to 7 in Tab  99 19.82  - fLA) × T2	0.78 20.31 19.99 0.75 le 9c) 19.18 fLA = Liv	0.89  19.62  19.98  0.87  18.22  ving area ÷ (4	0.93 19.04 19.97 0.92 17.38 4) =		(86) (87) (88) (89) (90) (91)
Tempera Utilisatio  (86)m=  Mean in  (87)m=  1  Tempera  (88)m=  1  Utilisatio  (89)m=  Mean in  (90)m=  1  Mean in  (92)m=  1	ature on fac Jan 0.92 Iterna 19.06 ature 19.95 on fac 0.91 Iterna 17.41	during heter for gase of temperature of the second	neating pains for  Mar  0.83  ature in  19.79  neating pains for  0.81  ature in  18.44  ature (for  19.28	living are 20.36 periods in 19.99 rest of do 0.68 the rest 19.22 per the whole 19.92	m the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 welling 0.52 of dwe 19.7	ving m (s / follo	ee Ta Jun 0.41  ow ste 20.92  velling 20.01  ,m (se 0.36  T2 (fi 19.94	Jul 0.31  pps 3 to 7 20.97  from Ta 20.01  ee Table 0.24  ollow ste 20  LA × T1 20.6	A A 0.3 of the control of the contro	ug Sep 36 0.56  Table 9c) 96 20.81  9, Th2 (°C) 02 20  29 0.5  to 7 in Tab 99 19.82  - fLA) × T2 59 20.43	0.78 20.31 19.99 0.75 e 9c) 19.18 fLA = Liv	0.89  19.62  19.98  0.87  18.22  ving area ÷ (4)	0.93 19.04 19.97 0.92		(86) (87) (88) (89)
Tempera Utilisatio  (86)m=  (86)m=  (Mean in (87)m=  1  Tempera (88)m=  1  Utilisatio (89)m=  (90)m=  1  Mean in (90)m=  1  Apply ac	ature on fac Jan 0.92 Iterna 19.06 Iterna 19.95 Iterna 17.41 Iterna 18.43 Idjustn	during heter for gase of temperature for gase of tempe	neating pains for  Mar  0.83  ature in  19.79  neating pains for  0.81  ature in  18.44  ature (for  19.28  he mean	living are 20.36 periods in 19.99 rest of de 0.68 the rest 19.22 per the what 19.92 in internal	n the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 welling 0.52 of dwe 19.7 nole dw 20.34 I tempe	ving m (s / follo 2 follo gif dw 2 f	ee Ta  Jun  0.41  ow ste  20.92  velling  20.01  ,m (se  0.36  T2 (fi  19.94  g) = fi  20.55  ure fro	Jul 0.31 ps 3 to 7 20.97 from Ta 20.01 ee Table 0.24 ollow ste 20  LA × T1 20.6 om Table	A 0.3 7 in 1 20. able 9 20. 9a) 0.2 eps 3 19. + (1 20.	ug Sep  36 0.56  able 9c)  96 20.81  9, Th2 (°C)  02 20  29 0.5  1 to 7 in Tab  99 19.82  - fLA) × T2  59 20.43  where appre	0.78  20.31  19.99  0.75  e 9c)  19.18  fLA = Liv	0.89  19.62  19.98  0.87  18.22  ving area ÷ (4)	0.93 19.04 19.97 0.92 17.38 4) =		(86) (87) (88) (89) (90) (91)
Tempera Utilisatio  (86)m=  Mean in (87)m=  1  Tempera (88)m=  1  Utilisatio (89)m=  Mean in (90)m=  1  Mean in (90)m=  1  Apply ac (93)m=  1	ature on fac Jan 0.92 aterna 19.06 ature 19.95 on fac 0.91 aterna 17.41 aterna 18.43 djustn 18.43	during heter for gase of temperature for gase of temperature for for gase of temperature for gase of temperature for for gase of temperature for gase of temperature for g	neating pains for 0.83 ature in 19.79 neating pains for 0.81 ature in 18.44 ature (for 19.28 he mear 19.28	living are 20.36 periods in 19.99 periods in 19.92 period	m the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 welling 0.52 of dwe 19.7	ving m (s / follo 2 follo gif dw 2 f	ee Ta Jun 0.41  ow ste 20.92  velling 20.01  ,m (se 0.36  T2 (fi 19.94	Jul 0.31  pps 3 to 7 20.97  from Ta 20.01  ee Table 0.24  ollow ste 20  LA × T1 20.6	A A 0.3 of the control of the contro	ug Sep  36 0.56  able 9c)  96 20.81  9, Th2 (°C)  02 20  29 0.5  1 to 7 in Tab  99 19.82  - fLA) × T2  59 20.43  where appre	0.78 20.31 19.99 0.75 e 9c) 19.18 fLA = Liv	0.89  19.62  19.98  0.87  18.22  ving area ÷ (4)	0.93 19.04 19.97 0.92 17.38 4) =		(86) (87) (88) (89) (90) (91)
Tempera Utilisatio  (86)m=  (86)m=  (1)  Mean in  (87)m=  1  Tempera  (88)m=  1  Utilisatio  (89)m=  (90)m=  1  Mean in  (90)m=  1  Apply ac  (93)m=  1  8. Space	ature on fac Jan 0.92 Iterna 19.06 ature 19.95 on fac 0.91 Iterna 17.41 Iterna 18.43 djustn 18.43 e hea	during heter for gase of the start of the st	neating pains for Mar 0.83 ature in 19.79 neating pains for 0.81 ature in 18.44 ature (for 19.28 ne mear 19.28 uirement	living are 20.36 periods in 19.99 rest of d 0.68 the rest 19.22 per the what 19.92 internal 19.92	n the livea, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 welling 0.52 of dwe 19.7 nole dw 20.34 I temper	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta  Jun  0.41  ow ste  20.92  velling  20.01  ,m (se  0.36  T2 (fi  19.94  g) = fi  20.55  ure fro  20.55	Jul 0.31 ps 3 to 7 20.97 from Ta 20.01 ee Table 0.24 ollow ste 20  LA × T1 20.6 pm Table 20.6	A 0.3 7 in 1 20. able 9 20. 9a) 0.2 eps 3 19. + (1 20. 2 4e, 20.	ug Sep 36 0.56  Table 9c) 96 20.81  9, Th2 (°C) 02 20  29 0.5  1 to 7 in Tab 99 19.82  - fLA) × T2 59 20.43  where appre	0.78  20.31  19.99  0.75  e 9c)  19.18  fLA = Livitation of the private of the pr	0.89  19.62  19.98  0.87  18.22  ving area ÷ (4)  19.08	0.93 19.04 19.97 0.92 17.38 4) =	0.62	(86) (87) (88) (89) (90) (91)
Tempera Utilisatio  (86)m=  (86)m=  (1)  Mean in  (87)m=  1  Tempera  (88)m=  1  Utilisatio  (89)m=  (90)m=  1  Mean in  (90)m=  1  Apply ac  (93)m=  1  8. Space	ature on fac Jan 0.92 Iterna 19.06 ature 19.95 on fac 0.91 Iterna 17.41 Iterna 18.43 djustn 18.43 e hea o the r	during heter for gase sector f	neating pains for Mar 0.83 ature in 19.79 neating pains for 0.81 ature in 18.44 ature (for 19.28 the mean 19.28 uiremented	living are 20.36 periods in 19.99 rest of d 0.68 the rest 19.22 per the what 19.92 rest of d 19.92 per the what 19.92 rest of d 19.92 rest of	the lives, h1,1 May 0.57 ea T1 ( 20.73 n rest of 19.99 welling 0.52 of dwe 19.7 nole dw 20.34 I temper 20.34 re obta	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta  Jun  0.41  ow ste  20.92  velling  20.01  ,m (se  0.36  T2 (fi  19.94  g) = fi  20.55  ure fro  20.55	Jul 0.31 ps 3 to 7 20.97 from Ta 20.01 ee Table 0.24 ollow ste 20  LA × T1 20.6 pm Table 20.6	A 0.3 7 in 1 20. able 9 20. 9a) 0.2 eps 3 19. + (1 20. 2 4e, 20.	ug Sep  36 0.56  able 9c)  96 20.81  9, Th2 (°C)  02 20  29 0.5  1 to 7 in Tab  99 19.82  - fLA) × T2  59 20.43  where appre	0.78  20.31  19.99  0.75  e 9c)  19.18  fLA = Livitation of the private of the pr	0.89  19.62  19.98  0.87  18.22  ving area ÷ (4)  19.08	0.93 19.04 19.97 0.92 17.38 4) =	0.62	(86) (87) (88) (89) (90) (91)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilisation factor for gains, hm:  (94)m= 0.89 0.85 0.79 0.68 0.54 0.39 0.28	3 0.33	0.53	0.74	0.85	0.9	1	(94)
Useful gains, hmGm , W = (94)m x (84)m	0.33	0.55	0.74	0.00	0.9		(34)
(95)m= 588.67 639.81 679.23 682.04 603.92 439.07 304.5	54 314.05	440.17	529.06	550.94	567.28	]	(95)
Monthly average external temperature from Table 8		ļ		ļ	<u> </u>	ı	
(96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6	6 16.4	14.1	10.6	7.1	4.2		(96)
Heat loss rate for mean internal temperature, Lm , W =[(39)	m x [(93)m	– (96)m	]		1	1	
(97)m= 1176.61 1147.9 1053.83 887.22 691.79 464.53 312.4		499.71	742.98	969.47	1160.18		(97)
Space heating requirement for each month, kWh/month = 0 $(98)$ m= $437.43$ $341.44$ $278.7$ $147.73$ $65.37$ $0$ $0$	.024 x [(97	m – (95 0	)m] x (4 159.16	1)m 301.34	441.12	1	
(98)m= 437.43 341.44 278.7 147.73 65.37 0 0		al per year	<u> </u>			2172.29	(98)
Change heading requirement in IVA/h/m2// care	1018	ai pei yeai	(KVVII/yeai	) = Sum(s	O)15,912 =		=
Space heating requirement in kWh/m²/year						30.2	(99)
9b. Energy requirements – Community heating scheme				., .			
This part is used for space heating, space cooling or water here. Fraction of space heat from secondary/supplementary heating.				unity sci	neme.	0	(301)
Fraction of space heat from community system 1 – (301) =						1	(302)
The community scheme may obtain heat from several sources. The procedu	ure allows for	CHP and	up to four	other heat	sources; t	he latter	
includes boilers, heat pumps, geothermal and waste heat from power station	ns. See Appe	ndix C.					¬,,,,,
Fraction of heat from Community boilers						0.4	(303a)
Fraction of community heat from heat source 2						0.4	(303b)
Fraction of total space heat from Community boilers			(3	02) x (303	sa) =	0.4	(304a)
Fraction of total space heat from community heat source 2			(3	02) x (303	3b) =	0.4	(304b)
Factor for control and charging method (Table 4c(3)) for com-	munity hea	ating sys	tem			1	(305)
Distribution loss factor (Table 12c) for community heating sys	stem					1.05	(306)
Space heating						kWh/yea	r_
Annual space heating requirement						2172.29	
Space heat from Community boilers		(98) x (3	04a) x (30	5) x (306)	=	912.36	(307a)
Space heat from heat source 2		(98) x (3	04b) x (30	5) x (306)	=	912.36	(307b)
Efficiency of secondary/supplementary heating system in %	(from Table	e 4a or A	ppendix	E)		0	(308
Space heating requirement from secondary/supplementary s	ystem	(98) x (3	01) x 100 -	÷ (308) =		0	(309)
Water heating						00.45.50	_
Annual water heating requirement  If DHW from community scheme:						2045.52	
Water heat from Community boilers		(64) x (3	03a) x (30	5) x (306)	=	859.12	(310a)
Water heat from heat source 2		(64) x (3	03b) x (30	5) x (306)	=	859.12	(310b)
Electricity used for heat distribution	0.01	× [(307a)	(307e) +	· (310a)	(310e)] =	35.43	(313)
Cooling System Energy Efficiency Ratio						0	(314)
Space cooling (if there is a fixed cooling system, if not enter	0)	= (107) ÷	- (314) =			0	(315)
Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from	nm nutsida					262.64	(330a)
moonamour vondiction balanced, extract or positive input in	Jili Galdide					202.04	(5564)

				_
warm air heating system fans			0	(330b)
pump for solar water heating			0	(330g)
Total electricity for the above, kWh/yea	ar :	=(330a) + (330b) + (330g) =	262.64	(331)
Energy for lighting (calculated in Apper	ndix L)		317.69	(332)
Electricity generated by PVs (Appendix	KM) (negative quantity)		-701.99	(333)
Electricity generated by wind turbine (A	Appendix M) (negative quantity)		0	(334)
10b. Fuel costs – Community heating	scheme			
	<b>Fuel</b> kWh/year	Fuel Price (Table 12)	Fuel Cost £/year	
Space heating from CHP	(307a) x	4.24 × 0.01 =	38.68	(340a)
Space heating from heat source 2	(307b) x	4.24 × 0.01 =	38.68	(340b)
Water heating from CHP	(310a) x	4.24 x 0.01 =	36.43	(342a)
Water heating from heat source 2	(310b) x	4.24 x 0.01 =	36.43	(342b)
		Fuel Price		
Pumps and fans	(331)	13.19 x 0.01 =	34.64	(349)
Energy for lighting	(332)	13.19 x 0.01 =	41.9	(350)
Additional standing charges (Table 12)			120	(351)
Energy saving/generation technologies	S			
Total energy cost	= (340a)(342e) + (345)(354) =		346.77	(355)
11b. SAP rating - Community heating	scheme			
Energy cost deflator (Table 12)			0.42	(356)
Energy cost deflator (Table 12) Energy cost factor (ECF)	[(355) x (356)] ÷ [(4) + 45.0] =		0.42	(356) (357)
, , ,	[(355) x (356)] ÷ [(4) + 45.0] =			
Energy cost factor (ECF)	ating scheme	Emission factor	1.25 82.63	(357)
Energy cost factor (ECF)  SAP rating (section12)	ating scheme Ener	gy Emission factor /year kg CO2/kWh	1.25 82.63	(357)
Energy cost factor (ECF)  SAP rating (section12)	eting scheme Ener kWh		1.25 82.63 Emissions kg CO2/year	(357)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community hea  CO2 from other sources of space and section is a section in the section in the section is a section in the section in the section is a section in the section in the section in the section is a section in the section in t	Ener kWh water heating (not CHP) If there is CHP using two fuels r	/year kg CO2/kWh	1.25 82.63 Emissions kg CO2/year	(357) (358)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)	Ener kWh water heating (not CHP) If there is CHP using two fuels r	kg CO2/kWh epeat (363) to (366) for the second fue	1.25 82.63 Emissions kg CO2/year	(357) (358) (367a)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)	Ener kWh water heating (not CHP) If there is CHP using two fuels r	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x 0.22	1.25 82.63  Emissions kg CO2/year  89 89 429.93	(357) (358) (367a) (367b) (367)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)  CO2 associated with heat source 1	Ener kWh.  water heating (not CHP)  If there is CHP using two fuels r  [(307b)+(310b)] x 10	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x 0.22 = 0 ÷ (367b) x 0.22 =	1.25 82.63  Emissions kg CO2/year  89 89 429.93	(357) (358) (367a) (367b)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)  CO2 associated with heat source 1  CO2 associated with heat source 2	Ener kWh.  water heating (not CHP)  If there is CHP using two fuels r  [(307b)+(310b)] x 10  [(307b)+(310b)] x 10	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x 0.22 0.52	1.25 82.63  Emissions kg CO2/year  89 89 429.93 429.93	(357) (358) (367a) (367b) (367) (368)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)  CO2 associated with heat source 1  CO2 associated with heat source 2  Electrical energy for heat distribution	Ener kWh.  water heating (not CHP)  If there is CHP using two fuels r  [(307b)+(310b)] x 10  [(313) x  systems (363)(366)	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x 0.22 0.52  0.52	1.25 82.63  Emissions kg CO2/year  89 89 429.93 429.93 18.39	(357) (358) (367a) (367b) (367) (368) (372)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)  CO2 associated with heat source 1  CO2 associated with heat source 2  Electrical energy for heat distribution  Total CO2 associated with community	Ener kWh.  water heating (not CHP)  If there is CHP using two fuels r  [(307b)+(310b)] x 10  [(313) x  systems (363)(366) econdary) (309) x	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x 0.22 0.52  0.52  0 0 0	1.25 82.63  Emissions kg CO2/year  89 89 429.93 429.93 18.39 878.25	(357) (358) (367a) (367b) (367) (368) (372) (373)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)  CO2 associated with heat source 1  CO2 associated with heat source 2  Electrical energy for heat distribution  Total CO2 associated with space heating (see	Ener kWh.  water heating (not CHP)  If there is CHP using two fuels r  [(307b)+(310b)] x 10  [(313) x  systems (363)(366) econdary) (309) x  rsion heater or instantaneous heat	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x	1.25 82.63  Emissions kg CO2/year  89 89 8429.93 429.93 18.39 878.25 0 0	(357) (358) (367a) (367b) (367) (368) (372) (373) (374)
Energy cost factor (ECF)  SAP rating (section12)  12b. CO2 Emissions – Community head  CO2 from other sources of space and efficiency of heat source 1 (%)  Efficiency of heat source 2 (%)  CO2 associated with heat source 1  CO2 associated with heat source 2  Electrical energy for heat distribution  Total CO2 associated with space heating (see CO2 associated with water from immentions)	Ener kWh.  water heating (not CHP)  If there is CHP using two fuels r  [(307b)+(310b)] x 10  [(307b)+(310b)] x 10  [(313) x  systems (363)(366) econdary) (309) x  rsion heater or instantaneous heatwater heating (373) + (374)	kg CO2/kWh epeat (363) to (366) for the second fue epeat (363) to (366) for the second fue epeat (367b) x	1.25 82.63  Emissions kg CO2/year  89 89 89 429.93 429.93 18.39 878.25	(357) (358) (367a) (367b) (367) (368) (372) (373) (374) (375)

CO2 associated with electricity for lighting	3	(332))) x	0.52	= 164.88	(379)
Energy saving/generation technologies (3	333) to (334) as appli	cable			_
Item 1			0.52 x 0.01	-364.33	(380)
Total CO2, kg/year	sum of (376)(382) =			815.11	(383)
Dwelling CO2 Emission Rate	(383) ÷ (4) =			11.33	(384)
El rating (section 14)				90.66	(385)
13b. Primary Energy – Community heating	g scheme				
		Energy kWh/year	Primary factor	P.Energy kWh/year	
Energy from other sources of space and Efficiency of heat source 1 (%)		HP) ing two fuels repeat (363) t	to (366) for the second	fuel 89	(367a)
Efficiency of heat source 2 (%)	If there is CHP usi	ing two fuels repeat (363) t	to (366) for the second	fuel 89	(367b)
Energy associated with heat source 1	[(307b)	)+(310b)] x 100 ÷ (367b) x	1.22	= 2428.32	(367)
Energy associated with heat source 2	[(307b)	)+(310b)] x 100 ÷ (367b) x	1.22	= 2428.32	(368)
Electrical energy for heat distribution		[(313) x		= 108.77	(372)
Total Energy associated with community	systems	(363)(366) + (368)(3	72)	= 4965.41	(373)
if it is negative set (373) to zero (unless	s specified otherwise,	see C7 in Appendix	C)	4965.41	(373)
Energy associated with space heating (see	econdary)	(309) x	0	= 0	(374)
Energy associated with water from immer	sion heater or instan	taneous heater(312) x	1.22	= 0	(375)
Total Energy associated with space and	water heating	(373) + (374) + (375) =		4965.41	(376)
Energy associated with space cooling		(315) x	3.07	= 0	(377)
Energy associated with electricity for pur	nps and fans within d	welling (331)) x	3.07	= 806.31	(378)
Energy associated with electricity for light	ing	(332))) x	3.07	975.31	(379)
Energy saving/generation technologies Item 1			3.07 × 0.01	-2155.12	(380)

sum of (376)...(382) =

Total Primary Energy, kWh/year

(383)

4591.92

User Details: John Ashe **Assessor Name:** Stroma Number: STRO031268 Stroma FSAP 2012 **Software Version: Software Name:** Version: 1.0.5.8 Property Address: Unit 10 - COPPETTS WOOD, London Address: 1. Overall dwelling dimensions Area(m²) Av. Height(m) Volume(m³) Ground floor (1a) x (2a) = (3a) 71.94 2.66 191.36 Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+....(1n)(4)71.94 Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+....(3n) =191.36 (5) total main secondary other m³ per hour heating heating x 40 =Number of chimneys (6a) 0 0 x 20 =Number of open flues 0 O O 0 0 (6b) Number of intermittent fans x 10 =(7a) 3 30 x 10 =Number of passive vents (7b) 0 0 x 40 =Number of flueless gas fires (7c)Air changes per hour Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = $\div$  (5) = (8) 0.16 If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) (9) O Additional infiltration (10)[(9)-1]x0.1 =0 Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction (11)0 if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0 0 (12) If no draught lobby, enter 0.05, else enter 0 (13)O Percentage of windows and doors draught stripped (14)0 Window infiltration  $0.25 - [0.2 \times (14) \div 100] =$ 0 (15)Infiltration rate (8) + (10) + (11) + (12) + (13) + (15) =O (16)Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area (17)5 If based on air permeability value, then  $(18) = [(17) \div 20] + (8)$ , otherwise (18) = (16)0.41 (18)Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered (19)0  $(20) = 1 - [0.075 \times (19)] =$ Shelter factor (20)1  $(21) = (18) \times (20) =$ Infiltration rate incorporating shelter factor 0.41 (21)Infiltration rate modified for monthly wind speed Jan Feb Jul Sep Mar Apr Mav Jun Aug Oct Nov Dec Monthly average wind speed from Table 7 (22)m =5.1 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7 Wind Factor  $(22a)m = (22)m \div 4$ (22a)m 1.27 1.25 1.23 1.08 0.95 0.95 0.92 1 1.08 1.12 1.1 1.18

	ration rate	e (allowi	ng for sh	elter an	d wind s	peed) =	(21a) x	(22a)m					
0.52	0.51	0.5	0.45	0.44	0.39	0.39	0.38	0.41	0.44	0.46	0.48		
Calculate effe		_	rate for t	he appli	cable ca	se	Į.		ļ	<u>I</u>			
If mechanic			o dia N. 70	OI- ) (OO -	) <b>.</b>		15)) - (		) (OO -)			0	(23a
If exhaust air h									) = (23a)			0	(23b
If balanced wit		•	•	Ū		`						0	(230
a) If balance	_					<del>- ` `                                 </del>	<del>- ^ ` `</del>	<u> </u>	<u> </u>	<del></del>	<del>```</del>	÷ 100]	(0.4
(24a)m= 0	0	0	0	0	0	0	0	0	0	0	0		<b>(24</b> a
b) If balance	1		ntilation			covery (N	ЛV) (24b	m = (22)	2b)m + (2	23b)	T	Ī	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24b
c) If whole h if (22b)r	nouse ext $m < 0.5 \times$			•	•				.5 × (23b	o)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(240
d) If natural if (22b)r	ventilation			•					0.5]				
(24d)m= 0.63	0.63	0.62	0.6	0.6	0.57	0.57	0.57	0.58	0.6	0.6	0.61		(240
Effective air	change	rate - er	iter (24a	) or (24b	o) or (24	c) or (24	d) in box	(25)				•	
(25)m= 0.63	0.63	0.62	0.6	0.6	0.57	0.57	0.57	0.58	0.6	0.6	0.61		(25)
3. Heat losse	es and he	at loss r	paramet	er:									
ELEMENT	Gros	·	Openin		Net Ar	ea	U-valı	ıe	AXU		k-value	<i>;</i>	ΑΧk
LLLIVILIVI	area	_	m		A ,r	n²	W/m2		(W/I	<b>〈</b> )	kJ/m²·l		kJ/K
Windows Type	e 1				14.83	x1.	/[1/( 1.4 )+	0.04] =	19.66				(27)
Windows Type	e 2				3.15	x1.	/[1/( 1.4 )+	0.04] =	4.18	$\overline{}$			(27)
Floor					71.94	x	0.13	i	9.3522	<u> </u>			(28)
Walls	57.6	4	17.98	3	39.66	5 x	0.18	<b>=</b>	7.14	Ħ i		7 F	(29)
Total area of e	elements	 , m²			129.5	8							
* for windows and	d roof winda	ows, use e	affective wi										(31)
** include the are	oo on both		TICCUIVC WI	ndow U-va	alue calcul	ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	ns given ir	paragraph	3.2	(31)
	as on bour	sides of in				ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	ns given ir	paragraph	3.2	(31)
Fabric heat los			nternal wali				formula 1.		ue)+0.04] a	as given ir	paragraph	3.2	
Fabric heat los Heat capacity	ss, W/K =	= S (A x	nternal wali					+ (32) =	ue)+0.04] a				(33)
	ss, W/K = Cm = S(	= S (A x A x k )	nternal wali U)	ls and part	titions			+ (32) = ((28)		2) + (32a)		40.33	(33)
Heat capacity Thermal mass For design assess	ss, W/K = Cm = S( s parame ssments who	= S (A x A x k ) ter (TMF ere the de	nternal wall U) P = Cm ÷ tails of the	s and part	titions n kJ/m²K		(26)(30)	+ (32) = ((28) Indica	(30) + (32 tive Value:	2) + (32a) : Medium	(32e) =	40.33 10293	(33)
Heat capacity Thermal mass For design assess can be used inste	ss, W/K = Cm = S( s parame ssments who ead of a det	= S (A x A x k ) ter (TMF ere the de tailed calcu	nternal wall U) P = Cm ÷ tails of the	s and pari - TFA) ir constructi	n kJ/m²K ion are not	t known pr	(26)(30)	+ (32) = ((28) Indica	(30) + (32 tive Value:	2) + (32a) : Medium	(32e) =	40.33 10293 250	(33)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg	ss, W/K = Cm = S( s parame ssments who ead of a det les : S (L	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calcu	Description of the collection.  The collection of the collection.  Collection of the collection.	s and part - TFA) ir constructi	n kJ/m²K ion are not pendix k	t known pr	(26)(30)	+ (32) = ((28) Indica	(30) + (32 tive Value:	2) + (32a) : Medium	(32e) =	40.33 10293	(33)
Heat capacity Thermal mass For design asses can be used inste Thermal bridg if details of thermal	ss, W/K = Cm = S( s parame ssments who ead of a det ges : S (L al bridging	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calcu	Description of the collection.  The collection of the collection.  Collection of the collection.	s and part - TFA) ir constructi	n kJ/m²K ion are not pendix k	t known pr	(26)(30)	+ (32) = ((28) Indica	(30) + (32 tive Values	2) + (32a) : Medium	(32e) =	40.33 10293 250 6.48	(33) (34) (35) (36)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of therma Total fabric he	ss, W/K = Cm = S( s parame ssments who ead of a det les : S (L lal bridging eat loss	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calcu are not kn	Definition of the culation.  Culated to cown (36) =	- TFA) ir constructi using Ap	n kJ/m²K ion are not pendix k	t known pr	(26)(30)	(28) Indica indicative (33) +	(30) + (32) tive Values of values of (36) =	2) + (32a) : Medium TMP in T	(32e) =	40.33 10293 250	(33) (34) (35) (36)
Thermal mass can be used instead if details of thermal Total fabric hermal ventilation her	ss, W/K = Cm = S( s parame sments who ead of a det les : S (L lal bridging eat loss at loss ca	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calcu are not kn	De = Cm :  tails of the ulation.  culated to the count (36) =	- TFA) ir constructiusing Ap	kJ/m²K ion are not pendix k	t known pr	(26)(30)	(28) Indica indicative (33) + (38)m	(30) + (32) tive Values of (36) = = 0.33 × (	2) + (32a) : Medium  TMP in T	(32e) =	40.33 10293 250 6.48	(33) (34) (35) (36)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of thermal Total fabric he Ventilation hea	ss, W/K = Cm = S( s parame sments who ead of a det les : S (L lal bridging eat loss at loss ca	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calc are not kn alculated Mar	Definition of the culation.  Culated to cown (36) =	- TFA) ir constructi using Ap = 0.05 x (3	kJ/m²K ion are not pendix k 1)	t known pr	ecisely the	(33) + (38)m Sep	(30) + (32) tive Values of values of (36) = = 0.33 × (	2) + (32a) : Medium TMP in T  25)m x (5	(32e) = Sable 1f	40.33 10293 250 6.48	(33) (34) (35) (36) (37)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of therm Total fabric he Ventilation hea  Jan (38)m= 40.07	ss, W/K = Cm = S( s parame sments whe ead of a det les : S (L lal bridging eat loss at loss ca Feb 39.74	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calc are not kn alculated Mar 39.41	Defermation of the culation.  Culated to cown (36) = Apr	- TFA) ir constructiusing Ap	kJ/m²K ion are not pendix k	t known pr	(26)(30)	(33) + (38)m Sep 36.8	(30) + (32) tive Values e values of  (36) = = 0.33 × (  Oct  37.61	2) + (32a) : Medium TMP in T  25)m x (5  Nov  38.19	(32e) =	40.33 10293 250 6.48	(33) (34) (35) (36) (37)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of therm Total fabric he Ventilation hea  Jan (38)m= 40.07  Heat transfer of	ss, W/K = Cm = S( s parame sments who ead of a det les : S (L lal bridging eat loss at loss ca Feb 39.74 coefficier	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calc are not kn alculated Mar 39.41	De = Cm : tails of the ulation. culated to cown (36) = d monthly Apr 37.9	- TFA) ir constructi using Ap - 0.05 x (3)  May 37.61	kJ/m²K ion are not spendix k 1) Jun 36.29	t known pr	Aug 36.04	(33) + (38)m Sep 36.8 (32) = ((28) (100) Indicative	(30) + (32) tive Value: e values of  (36) = = 0.33 × (  Oct  37.61  = (37) + (3)	2) + (32a) : Medium  TMP in T  25)m x (5  Nov  38.19	(32e) =  lable 1f  Dec  38.79	40.33 10293 250 6.48	(33) (34) (35) (36) (37)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of therm Total fabric he Ventilation hea  Jan (38)m= 40.07	ss, W/K = Cm = S( s parame sments whe ead of a det les : S (L lal bridging eat loss at loss ca Feb 39.74	= S (A x A x k ) ter (TMF ere the de tailed calcu x Y) calc are not kn alculated Mar 39.41	Defermation of the culation.  Culated to cown (36) = Apr	- TFA) ir constructi using Ap = 0.05 x (3	kJ/m²K ion are not pendix k 1)	t known pr	ecisely the	(33) + (38)m Sep 36.8 (39)m 83.61	(30) + (32) tive Values e values of  (36) = = 0.33 × (  Oct  37.61  = (37) + (32)	2) + (32a)  : Medium  TMP in T  25)m x (5  Nov  38.19  38)m  84.99	(32e) = Sable 1f  Dec 38.79	40.33 10293 250 6.48 46.81	(33) (34) (35) (36) (37)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of thermal Total fabric he Ventilation hea  [38]m= 40.07  Heat transfer (39)m= 86.87	ss, W/K = Cm = S( s parame sments who ead of a det es : S (L eal bridging eat loss at loss ca Feb 39.74  coefficier 86.54	e S (A x k ) ter (TMF ere the de tailed calculate de mar alculate de mar 39.41 ht, W/K 86.22	Defermation of the culated cul	- TFA) ir constructi using Ap - 0.05 x (3)  May 37.61	kJ/m²K ion are not spendix k 1) Jun 36.29	t known pr	Aug 36.04	(33) + (38)m Sep 36.8 (39)m 83.61	(30) + (32) tive Value: e values of  (36) = = 0.33 × (  Oct  37.61  = (37) + (3)	2) + (32a) : Medium TMP in T  25)m x (5  Nov 38.19  38)m  84.99  Sum(39)	(32e) = Sable 1f  Dec 38.79	40.33 10293 250 6.48	(31) (33) (34) (35) (36) (37) (38)
Heat capacity Thermal mass For design assess can be used inste Thermal bridg if details of therm Total fabric he Ventilation hea  Jan (38)m= 40.07  Heat transfer of	ss, W/K = Cm = S( s parame sments who ead of a det es : S (L eal bridging eat loss at loss ca Feb 39.74  coefficier 86.54	e S (A x k ) ter (TMF ere the de tailed calculate de mar alculate de mar 39.41 ht, W/K 86.22	Defermation of the culated cul	- TFA) ir constructi using Ap - 0.05 x (3)  May 37.61	kJ/m²K ion are not spendix k 1) Jun 36.29	t known pr	Aug 36.04	(33) + (38)m Sep 36.8 (39)m 83.61	(30) + (32) tive Values of values of (36) = = 0.33 × (  Oct 37.61 = (37) + (32) 44.42 Average =	2) + (32a) : Medium TMP in T  25)m x (5  Nov 38.19  38)m  84.99  Sum(39)	(32e) = Sable 1f  Dec 38.79	40.33 10293 250 6.48 46.81	(33) (34) (35) (36) (37) (38)

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

Number of days in month (Table 1a)

	Jan	reb	iviai	Apı	Iviay	Juli	Jui	Aug	Seb	Oct	INOV	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
'								•					•	
4. Wa	iter heat	ing ener	av reaui	irement:								kWh/ye	ear:	
			37 1 2 4 21											
		pancy, I		F4	( 0 0000	) 40 /T	- 400	\0\1 · 0 /	2040 (	FEA 40		29		(42)
	A > 13.9 A £ 13.9		+ 1./6 X	[1 - ехр	(-0.0003	349 x (11	-A -13.9	)2)] + 0.0	0013 x (	IFA -13.	.9)			
		•	ater usad	ne in litre	es per da	av Vd.av	erage =	(25 x N)	+ 36		88	.64		(43)
									a water us	se target o		.0-1		(1.5)
not more	that 125	litres per µ	person per	day (all w	ater use, i	hot and co	ld)							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate	er usage ii	n litres per	day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)					_	
(44)m=	97.51	93.96	90.41	86.87	83.32	79.78	79.78	83.32	86.87	90.41	93.96	97.51		
1										Total = Su	m(44) <sub>112</sub> =	=	1063.7	(44)
Energy o	content of	hot water	used - cal	culated mo	onthly $= 4$ .	190 x Vd,r	n x nm x E	OTm / 3600	) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		_
(45)m=	144.6	126.47	130.5	113.78	109.17	94.21	87.3	100.17	101.37	118.14	128.95	140.04		
'						!	!			Total = Su	m(45) <sub>112</sub> =	=	1394.68	(45)
If instant	taneous w	ater heatir	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46	) to (61)					_
(46)m=	0	0	0	0	0	0	0	0	0	0	0	0		(46)
Water	storage	loss:							!					
Storage	e volum	e (litres)	includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		150		(47)
If comr	munity h	eating a	nd no ta	ınk in dw	elling, e	nter 110	litres in	(47)						
			hot wate	er (this in	ıcludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (	47)			
	storage												1	
,					or is kno	wn (kVVI	n/day):					0		(48)
Tempe	erature f	actor fro	m Table	2b								0		(49)
0,		m water	•					(48) x (49)	) =			0		(50)
•				-	oss fact								1	4
		age loss eating s			e 2 (kW	n/iitre/da	iy)					0		(51)
	,	from Tal		011 4.5								0	1	(52)
		actor fro		2b							-	0		(53)
•		m water			oar			(47) v (51)	) x (52) x (	53) -				
0.		54) in (5	•	, KVVII/ y C	sai			(47) X (31)	) X (32) X (	55) =	-	0		(54) (55)
		loss cal	•	for each	month			((56)m - (	55) × (41)	m		0		(00)
								· · ·		1		ı	1	(==)
(56)m=	0	0	0	0	0 (50)	0	0	0	0 (50)	0	0	0	Page 1.1	(56)
If cylinde	er contains	dedicated	d solar sto	rage, (57)i	m = (56)m	x [(50) – (	H11)] ÷ (5	0), else (5	/)m = (56)	m where (	H11) is fro	m Append	IIX H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
Primar	v circuit	loss (an	inual) fro	m Table	e 3							0		(58)
	•	•	•			59)m = (	(58) ÷ 36	65 × (41)	m				•	
(mod	dified by	factor fr	om Tab	le H5 if t	here is s	solar wat	er heati	ng and a	cylinde	r thermo	stat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	lose cal	culated	for each	month /	(61)m –	(60) ÷ 30	65 × (41)	)m	•		•		•	
(61)m=	0	0	0	0	0	00) + 30	0	0	0	0	0	0		(61)
(01)1112	U	U	U		L "	<u> </u>	L		L "	L "	L "		I	(01)

Total heat required for water he	eating calculate	d for eac	h month	(62)m	= 0.85 × (	(45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 122.91 107.5 110.93	96.71 92.79	80.07	74.2	85.15	86.16	100.42	109.61	119.03		(62)
Solar DHW input calculated using Appe	endix G or Append	x H (negat	ve quantity	/) (enter	'0' if no sola	r contribut	ion to wate	er heating)	•	
(add additional lines if FGHRS	and/or WWHR	S applies	, see Ap	pendix	(G)		-		_	
(63)m= 0 0 0	0 0	0	0	0	0	0	0	0		(63)
Output from water heater										
(64)m= 122.91 107.5 110.93	96.71 92.79	80.07	74.2	85.15	86.16	100.42	109.61	119.03		_
				O	utput from wa	ater heate	r (annual)₁	112	1185.48	(64)
Heat gains from water heating,	kWh/month 0.2	25 ´ [0.85	× (45)m	+ (61)	m] + 0.8 x	k [(46)m	+ (57)m	+ (59)m	]	
(65)m= 30.73 26.87 27.73	24.18 23.2	20.02	18.55	21.29	21.54	25.1	27.4	29.76		(65)
include (57)m in calculation of	of (65)m only if	cylinder i	s in the o	dwellin	g or hot w	ater is fr	om com	munity h	eating	
5. Internal gains (see Table 5	and 5a):									
Metabolic gains (Table 5), Watt	ts								_	
Jan Feb Mar	Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m= 114.61 114.61 114.61	114.61 114.61	114.61	114.61	114.6 <sup>-</sup>	114.61	114.61	114.61	114.61		(66)
Lighting gains (calculated in Ap	pendix L, equa	tion L9 o	r L9a), a	lso se	e Table 5					
(67)m= 17.99 15.98 12.99	9.84 7.35	6.21	6.71	8.72	11.7	14.86	17.34	18.49		(67)
Appliances gains (calculated in	Appendix L, e	quation L	13 or L1	3a), al	so see Ta	ble 5				
(68)m= 201.78 203.88 198.6	187.37 173.19	159.86	150.96	148.86	5 154.14	165.37	179.55	192.88		(68)
Cooking gains (calculated in Ap	opendix L, equa	ation L15	or L15a)	, also	see Table	5	-	-	•	
(69)m= 34.46 34.46 34.46	34.46 34.46	34.46	34.46	34.46	34.46	34.46	34.46	34.46		(69)
Pumps and fans gains (Table 5	ia)	•	•		•				•	
(70)m= 0 0 0	0 0	0	0	0	0	0	0	0		(70)
Losses e.g. evaporation (negat	ive values) (Ta	ble 5)	•		•				•	
(71)m= -91.69 -91.69 -91.69	-91.69 -91.69	-91.69	-91.69	-91.69	91.69	-91.69	-91.69	-91.69		(71)
Water heating gains (Table 5)	•	•	•	•	•	•		•	•	
(72)m= 41.3 39.99 37.27	33.58 31.18	27.8	24.93	28.61	29.92	33.74	38.06	40		(72)
Total internal gains =	•	(66	)m + (67)m	ı + (68)n	n + (69)m + (	(70)m + (7	1)m + (72)	)m	•	
(73)m= 318.46 317.23 306.25	288.17 269.11	251.26	239.98	243.58	3 253.14	271.36	292.34	308.75		(73)
6. Solar gains:										
Solar gains are calculated using solar	r flux from Table 6a	and assoc	ciated equa	tions to	convert to th	ne applicab	ole orientat	tion.		
Orientation: Access Factor	Area	Flu			g_ Table 6b	т.	FF		Gains	
Table 6d	m <sup>2</sup>	Ta	ble 6a	. –	Table 6b		able 6c		(W)	_
North 0.9x 0.77 x	14.83	X	10.63	x	0.63	x	0.7	=	48.19	(74)
North 0.9x 0.77 x	14.83	x	20.32	x	0.63	x	0.7	=	92.1	(74)
North 0.9x 0.77 x	14.83	x ;	34.53	X	0.63	X	0.7	=	156.5	(74)
North 0.9x 0.77 x	14.83	x	55.46	X	0.63	X	0.7	=	251.38	(74)
North 0.9x 0.77 x	14.83	X	74.72	X	0.63	x	0.7	=	338.63	(74)
North 0.9x 0.77 x	14.83	X	79.99	x	0.63	x	0.7	=	362.51	(74)
North 0.9x 0.77 x	14.83	X	74.68	х	0.63	x	0.7	=	338.45	(74)
North 0.9x 0.77 x	14.83	x .	59.25	X	0.63	X	0.7	=	268.52	(74)

North	0.9x	0.77	x	14.	83	x	41	1.52	x	0.63	x	0.7	=	188.16	(74)
North	0.9x	0.77	Х	14.	83	x	24	1.19	x	0.63	x	0.7	=	109.63	(74)
North	0.9x	0.77	х	14.	83	x	13	3.12	x	0.63	×	0.7	_ =	59.45	(74)
North	0.9x	0.77	Х	14.	83	x	8.	.86	x	0.63	×	0.7		40.18	(74)
West	0.9x	0.77	х	3.	15	x	19	9.64	x	0.63	x	0.7	<u>=</u>	18.91	(80)
West	0.9x	0.77	х	3.′	15	x	38	3.42	x	0.63	x	0.7	=	36.99	(80)
West	0.9x	0.77	х	3.	15	x	63	3.27	x	0.63	x	0.7	=	60.91	(80)
West	0.9x	0.77	X	3.′	15	x	92	2.28	х	0.63	×	0.7	=	88.84	(80)
West	0.9x	0.77	х	3.′	15	x	11:	3.09	х	0.63	x	0.7	=	108.87	(80)
West	0.9x	0.77	х	3.	15	x	11	5.77	x	0.63	x	0.7	=	111.45	(80)
West	0.9x	0.77	X	3.′	15	x	110	0.22	х	0.63	x	0.7	=	106.11	(80)
West	0.9x	0.77	X	3.′	15	x	94	1.68	x	0.63	x	0.7	=	91.14	(80)
West	0.9x	0.77	X	3.	15	x	73	3.59	x	0.63	x	0.7	=	70.84	(80)
West	0.9x	0.77	х	3.′	15	x	45	5.59	х	0.63	x	0.7	=	43.89	(80)
West	0.9x	0.77	х	3.′	15	x	24	1.49	x	0.63	x	0.7	=	23.58	(80)
West	0.9x	0.77	X	3.	15	x	16	6.15	x	0.63	×	0.7	=	15.55	(80)
	-												<u>-</u>		
Solar o	ains in	watts, ca	alculated	l for eac	h mont	h			(83)m	n = Sum(74)m	(82)m	1			
(83)m=	67.1	129.09	217.41	340.21	447.5	$\neg$	73.96	444.56	359	<del></del>	153.5		55.72	1	(83)
` ′ L		nternal a								1			1	J	, ,
(84)m=	385.56	446.32	523.66	628.38	716.61	<del></del>	25.22	684.54	603	.24 512.15	424.8	88 375.37	364.47	1	(84)
L		l	l				20.22	004.54	003	.24   312.13	424.0	373.37	304.47		(04)
7. Mea	an inter	rnal temp	aratura	/hooting		- N									
		nai tomp	<i>J</i> erature	(nealing	seaso	n)									
				`			area fr	om Tal	ole 9	, Th1 (°C)				21	(85)
Tempe	erature		neating p	eriods i	n the liv	/ing			ole 9	, Th1 (°C)				21	(85)
Tempe	erature	during h	neating p	eriods i	n the liv	ving m (s				, Th1 (°C)	Oc	t Nov	Dec	21	(85)
Tempe	erature ition fac	during h	neating p	eriods in	n the liv	ring m (s	ee Tab	ole 9a)		ug Sep	Oc 0.99	+	Dec 1	21	(85)
Tempe Utilisa (86)m=	erature tion fac Jan 1	during heter for g	neating p ains for l Mar 0.99	eriods in iving are Apr 0.96	n the livea, h1,r May	ving m (s	ee Tab Jun 0.68	Jul 0.52	A 0.6	ug Sep 51 0.88	┢	+	1	21	
Tempo Utilisa (86)m=	erature ition fac Jan 1 interna	during heter for general Feb	neating p ains for l Mar 0.99	eriods in living are Apr 0.96 living ar	n the livea, h1,r May 0.87	ving m (s	ee Tab Jun 0.68	Jul 0.52 os 3 to 7	0.6	ug Sep 51 0.88 able 9c)	0.99	1	1	21	(86)
Tempo Utilisa (86)m= Mean (87)m=	erature tion fac Jan 1 interna	during heter for general Feb 1 temper 19.77	neating pains for Mar 0.99 ature in 20.05	eriods in living are Apr 0.96 living ar 20.45	n the livea, h1,r May 0.87 ea T1 (	ring m (s r follo	Jun 0.68 w step	Jul 0.52 os 3 to 7 20.99	A 0.67 in T 20.	ug Sep 61 0.88 Table 9c) 98 20.83	┢	1	1	21	
Tempo Utilisa (86)m= [ Mean (87)m= [ Tempo	erature tion fac Jan 1 interna 19.62 erature	during heter for g Feb 1 temper 19.77 during h	neating p ains for I Mar 0.99 ature in 20.05	eriods in iving are 0.96 living ar 20.45 eriods in	n the lives a, h1,r May 0.87 ea T1 ( 20.79	ring (s	Jun 0.68  w step 20.95 velling t	Jul 0.52 os 3 to 7 20.99 from Ta	A 0.67 in T 20.	ug Sep 51 0.88 Table 9c) 98 20.83 9, Th2 (°C)	20.4	19.95	19.61	21	(86)
Tempo Utilisa (86)m= Mean (87)m=	erature tion fac Jan 1 interna	during heter for general Feb 1 temper 19.77	neating pains for Mar 0.99 ature in 20.05	eriods in living are Apr 0.96 living ar 20.45	n the livea, h1,r May 0.87 ea T1 (	ring (s	Jun 0.68 w step	Jul 0.52 os 3 to 7 20.99	A 0.67 in T 20.	ug Sep 51 0.88 Table 9c) 98 20.83 9, Th2 (°C)	0.99	19.95	1	21	(86)
Tempo Utilisa (86)m= [ Mean (87)m= [ Tempo (88)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91	during heter for g Feb 1 temper 19.77 during h	meating pains for Mar 0.99 ature in 20.05 neating p	Apr 0.96 living are 20.45 eriods in	n the lives a, h1,r May 0.87 ea T1 ( 20.79 n rest o	ring m (s	Jun 0.68 w step 20.95 velling 1	Jul 0.52 os 3 to 7 20.99 from Ta	A 0.67 in T 20.	ug Sep 51 0.88 Table 9c) 98 20.83 9, Th2 (°C)	20.4	19.95	19.61	21	(86)
Tempo Utilisa (86)m= [ Mean (87)m= [ Tempo (88)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91	during heter for g Feb 1 Itemper 19.77 during h	meating pains for Mar 0.99 ature in 20.05 neating p	Apr 0.96 living are 20.45 eriods in	n the lives a, h1,r May 0.87 ea T1 ( 20.79 n rest o	ving m (s	Jun 0.68 w step 20.95 velling 1	Jul 0.52 os 3 to 7 20.99 from Ta	A 0.67 in T 20.	ug Sep 61 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95	20.4	19.95	19.61	21	(86)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1	during heter for g Feb 1 temper 19.77 during heter for g 1	meating properties of the second properties of	Apr 0.96 living ar 20.45 eriods ii 19.94 rest of d	n the lives, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82	ring m (s	Jun 0.68 ow step 20.95 orelling 19.96 om (see	ole 9a)  Jul  0.52  os 3 to 7  20.99  from Ta  19.96  e Table  0.4	A 0.67 in T 20. able 9 19. 9a) 0.4	ug Sep 61 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95	0.99 20.4 19.9	19.95	19.61	21	(86) (87) (88)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1	during heter for g Feb 1 temper 19.77 during heter for g 1	meating properties of the second properties of	Apr 0.96 living ar 20.45 eriods ii 19.94 rest of d	n the lives, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82	ring (s (s / l) (s / l	Jun 0.68 ow step 20.95 orelling 19.96 om (see	ole 9a)  Jul  0.52  os 3 to 7  20.99  from Ta  19.96  e Table  0.4	A 0.67 in T 20. able 9 19. 9a) 0.4	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  to 7 in Tab	0.99 20.4 19.9	1 19.95 4 19.93	19.61		(86) (87) (88)
Tempor Utilisa (86)m= [  Mean (87)m= [  Tempor (88)m= [  Utilisa (89)m= [  Mean (89)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1 interna	during heter for g Feb 1 Itemper 19.77 during h 19.92 eter for g 1 temper	meating properties are attread in the second	eriods in iving are 0.96 living are 20.45 eriods in 19.94 rest of d 0.95 the rest	n the lives a, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe	ring (s (s / l) (s / l	Jun 0.68 w step 20.95 velling 1 9.96 m (see 0.59 T2 (fo	Jul 0.52 os 3 to 7 20.99 from Ta 19.96 e Table 0.4	A 0.66 7 in T 20. 19. 9a) 0.4	ug Sep 51 0.88 Table 9c) 98 20.83 9, Th2 (°C) 96 19.95 18 0.81 1 to 7 in Tab 95 19.86	0.99 20.4 19.9 0.98 le 9c)	1 19.95 4 19.93 5 1	1 19.61 19.93 1 18.66		(86) (87) (88) (89)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1 interna 18.66	during heter for g Feb 1 temper 19.77 during h 19.92 eter for g 1 temper 18.81	neating p ains for l Mar 0.99 ature in 20.05 neating p 19.92 ains for l 0.99 ature in 19.09	Apr 0.96 living are 20.45 eriods ii 19.94 rest of d 0.95 the rest 19.5	n the livea, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8	ring m (s follo	ee Tab  Jun  0.68  w step 20.95  relling 1 9.96  m (see 0.59  T2 (fo 9.94	Jul 0.52 0.53 to 7 20.99 from Ta 19.96 e Table 0.4 Illow ste	A 0.6. 7 in T 20. able 9 19. 9a) 0.4 eps 3	ug Sep 61 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86	0.99 20.4 19.9 0.98 le 9c)	1 19.95 4 19.93	1 19.61 19.93 1 18.66	0.62	(86) (87) (88) (89)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1 interna 18.66	during heter for g Feb 1 1 1 temper 19.77 during h 19.92 ctor for g 1 1 temper 18.81	meating properties of the second properties of	eriods in iving are 0.96 living are 20.45 eriods in 19.94 rest of d 0.95 the rest 19.5 er the wh	n the lives, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8	ring m (s / l / l / l / l / l / l / l / l / l /	ee Tab  Jun  0.68  w step 20.95  velling 1 9.96  m (see 0.59  T2 (fo 9.94  g) = fL	Jul 0.52 os 3 to 7 20.99 from Ta 19.96 e Table 0.4 Illow ste 19.95	A 0.6 1 20. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  — fLA) × T2	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L	1 19.95 4 19.93 5 1 6 19 ving area ÷ (	1 19.61 19.93 1 18.66 4) =		(86) (87) (88) (89) (90) (91)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1 interna 18.66 interna 19.25	during heter for g Feb 1 temper 19.77 during h 19.92 eter for g 1 temper 18.81	neating pains for land 19.99 ature in 20.05 neating pains for land 19.99 ature in 19.09 ature in 19.09	Apr 0.96 living are 20.45 eriods in 19.94 rest of d 0.95 the rest 19.5	n the livea, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8	ring m (s follo follo follo follo follo gelling follo gelling gelling	ee Tab  Jun  0.68  w step 20.95  relling 1 9.96  T2 (fo 9.94  g) = fL	Jul 0.52 0.52 0.53 to 7 20.99 from Ta 19.96 0.4 Illow ste 19.95 A × T1 20.59	A 0.6. 7 in T 20. able 9 19. 9a) 0.4 19. + (1 20.	ug Sep 61 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  - fLA) × T2 59 20.46	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L	1 19.95 19.95 1 19.93 1 19.93 1 1 19.93 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 19.61 19.93 1 18.66		(86) (87) (88) (89)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [ Mean (92)m= [ Apply	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1 interna 18.66 interna 19.25 adjustr	during heter for g Feb 1 1 Itemper 19.77 during h 19.92 eter for g 1 Itemper 18.81 Itemper 19.41 ment to t	meating properties of the mean residue of the	Apr 0.96 living are 20.45 eriods in 19.94 rest of d 0.95 the rest 19.5 r the wh 20.09	n the lives, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8 nole dw 20.41 I tempe	ring m (s follo follo follo follo follo g f dw flilling g f dw friend f dw fri	ee Tab  Jun  0.68  w step 20.95  relling 1 9.96  m (see 0.59  T2 (fo 9.94  g) = fL 20.56  ure fron	Jul 0.52 os 3 to 7 20.99 from Ta 19.96 e Table 0.4 Illow ste 19.95 A × T1 20.59 m Table	A 0.6 1 20. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  — fLA) × T2 59 20.46  where appre	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L	1 19.95 4 19.93 4 19.93 5 1 6 19 ving area ÷ (	1 19.61 19.93 1 18.66 4) =		(86) (87) (88) (89) (90) (91) (92)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [ Mean (92)m= [ Apply (93)m= [	erature tion fac Jan 1 interna 19.62 erature 19.91 tion fac 1 interna 18.66 interna 19.25 adjustr 19.25	during heter for g Feb 1 letemper 19.77 during heter for g 19.92 eter for g 1 letemper 18.81 letemper 19.41 ment to t 19.41	neating pains for land 19.69 he ature in 19.69 he mean 19.69	Apr 0.96 living are 20.45 eriods in 19.94 rest of d 0.95 the rest 19.5	n the livea, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8	ring m (s follo follo follo follo follo g f dw flilling g f dw friend f dw fri	ee Tab  Jun  0.68  w step 20.95  relling 1 9.96  T2 (fo 9.94  g) = fL	Jul 0.52 0.52 0.53 to 7 20.99 from Ta 19.96 0.4 Illow ste 19.95 A × T1 20.59	A 0.6. 7 in T 20. able 9 19. 9a) 0.4 19. + (1 20.	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  — fLA) × T2 59 20.46  where appre	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L	1 19.95 4 19.93 4 19.93 5 1 6 19 ving area ÷ (	1 19.61 19.93 1 18.66 4) =		(86) (87) (88) (89) (90) (91)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [ Apply (93)m= [ 8. Spa	erature tion fact Jan 1 interna 19.62 erature 19.91 tion fact 1 interna 18.66 interna 19.25 adjustr 19.25	during heter for g Feb 1 1 1 temper 19.77 during h 19.92 ctor for g 1 1 temper 18.81 ltemper 19.41 ment to t 19.41 tting requires	meating properties of the mean	eriods in iving are 0.96 living are 20.45 eriods in 19.94 erest of d 0.95 er the rest 19.5 er the who 20.09 internal 20.09	n the lives, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8 nole dw 20.41 I tempe 20.41	ring m (s / l / l / l / l / l / l / l / l / l /	ee Tab  Jun  0.68  w step  0.95  velling t  9.96  T2 (fo  9.94  g) = fL  0.56  ure fron  0.56	Jul 0.52 os 3 to 7 20.99 from Ta 19.96 e Table 0.4 Illow ste 19.95 A × T1 20.59 m Table 20.59	A 0.6 19. 19. 19. 19. 19. 19. 19. 19. 19. 19.	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  — fLA) × T2 59 20.46  where appress 59 20.46	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L 20.0 opriate 20.0	1 19.95 4 19.93 4 19.59 4 19.59	1 19.61 19.93 1 18.66 4) =	0.62	(86) (87) (88) (89) (90) (91) (92)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [ Apply (93)m= [ Apply (93)m= [ Set Ti	erature tion fact Jan 1 interna 19.62 erature 19.91 tion fact 1 interna 18.66 interna 19.25 adjustr 19.25 ace head to the	during heter for general for for gener	meating properties of the mean	eriods in iving are 0.96 living are 20.45 eriods in 19.94 erest of d 0.95 the rest 19.5 er the wheeless of the constant of the properties	the lives a, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8 and de dw 20.41 I tempe 20.41 re obta	ring m (s / l / l / l / l / l / l / l / l / l /	ee Tab  Jun  0.68  w step  0.95  velling t  9.96  T2 (fo  9.94  g) = fL  0.56  ure fron  0.56	Jul 0.52 os 3 to 7 20.99 from Ta 19.96 e Table 0.4 Illow ste 19.95 A × T1 20.59 m Table 20.59	A 0.6 19. 19. 19. 19. 19. 19. 19. 19. 19. 19.	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  — fLA) × T2 59 20.46  where appre	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L 20.0 opriate 20.0	1 19.95 4 19.93 4 19.59 4 19.59	1 19.61 19.93 1 18.66 4) =	0.62	(86) (87) (88) (89) (90) (91) (92)
Tempor Utilisa (86)m= [ Mean (87)m= [ Tempor (88)m= [ Utilisa (89)m= [ Mean (90)m= [ Apply (93)m= [ Apply (93)m= [ Set Ti	erature tion fact Jan 1 interna 19.62 erature 19.91 tion fact 1 interna 18.66 interna 19.25 adjustr 19.25 ace head to the disation	during heter for g Feb 1 1 1 temper 19.77 during h 19.92 ctor for g 1 1 temper 18.81 ltemper 19.41 ment to t 19.41 tting requires	meating properties are also properties at the control of the contr	eriods in iving are 0.96 living are 20.45 eriods in 19.94 erest of d 0.95 the rest 19.5 er the wheeless of the constant of the properties	the lives a, h1,r May 0.87 ea T1 ( 20.79 n rest o 19.94 welling 0.82 of dwe 19.8 and de dw 20.41 I tempe 20.41 re obta	ring m (s / l / l / l / l / l / l / l / l / l /	ee Tab  Jun  0.68  w step  0.95  velling t  9.96  T2 (fo  9.94  g) = fL  0.56  ure fron  0.56	Jul 0.52 os 3 to 7 20.99 from Ta 19.96 e Table 0.4 Illow ste 19.95 A × T1 20.59 m Table 20.59	A 0.6 19. 19. 19. 19. 19. 19. 19. 19. 19. 19.	ug Sep 51 0.88  Table 9c) 98 20.83  9, Th2 (°C) 96 19.95  18 0.81  1 to 7 in Tab 95 19.86  — fLA) × T2 59 20.46  where appress 59 20.46	0.99 20.4 19.9 0.98 le 9c) 19.4 fLA = L 20.0 opriate 20.0	1 19.95 4 19.93 4 19.59 4 19.59	1 19.61 19.93 1 18.66 4) =	0.62	(86) (87) (88) (89) (90) (91) (92)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilisa	ation fac	tor for g	ains, hm	1:										
(94)m=	1	1	0.99	0.95	0.84	0.65	0.48	0.56	0.85	0.98	1	1		(94)
Usefu	ıl gains,	hmGm	, W = (94	4)m x (8	4)m	•		•				•		
(95)m=	384.79	444.4	517.08	597.82	603.63	469.7	327.3	337.48	434.38	415.82	373.9	363.93		(95)
Mont	hly aver	age exte	ernal 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 rate	e for me	an intern	al tempo	erature,	Lm , W =	=[(39)m	x [(93)m	– (96)m	]				
(97)m=	1299.2	1255.47	1137.02	947.8	735.32	495.66	331.92	347.01	531.8	797.04	1061.61	1287.71		(97)
Spac	e heatin	g require	ement fo	r each n	nonth, k\	Wh/mon	th = 0.02	24 x [(97	)m – (95	)m] x (4	1)m			
(98)m=	680.32	545.04	461.24	251.99	97.98	0	0	0	0	283.63	495.15	687.29		
		-		-	-	-	-	Tota	l per year	(kWh/yeaı	) = Sum(9	8) <sub>15,912</sub> =	3502.64	(98)
Spac	e heatin	g require	ement in	kWh/m²	²/year							İ	48.69	(99)
		•	quiremer		•									
		Ĭ	July and		Saa Tal	hle 10h								
Calco	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat		l .							<u> </u>			able 10)		
(100)m=		0	0	0	0	781.11	614.92	629.67	0	0	0	0		(100)
Utilisa	ation fac	tor for lo	oss hm	Į					!	Į.	<u>I</u>	<u>I</u>		
(101)m=	0	0	0	0	0	0.9	0.94	0.91	0	0	0	0		(101)
Usefu	ıl loss, h	ımLm (V	Vatts) = (	(100)m x	(101)m		ļ		ļ	<u> </u>	ļ.			
(102)m=	0	0	0	0	0	701.46	580.58	574.69	0	0	0	0		(102)
Gains	s (solar	gains ca	lculated	for appli	cable w	eather re	egion, se	e Table	10)					
(103)m=	0	0	0	0	0	932.8	883.52	789.87	0	0	0	0		(103)
			ement fo (104)m <			dwelling,	continu	ous ( kW	h' = 0.0	24 x [(10	03)m – (	102)m ] x	c (41)m	
(104)m=		0	0	0	0	166.56	225.38	160.09	0	0	0	0		
		!	!		!	!	!	!	Tota	= Sum(	104)	=	552.03	(104)
Cooled	d fraction	n							f C =	cooled	area ÷ (4	1) =	1	(105)
Interm	ittency f	actor (Ta	able 10b	)										_
(106)m=	0	0	0	0	0	0.25	0.25	0.25	0	0	0	0		_
							4		Tota	l = Sum(	(104)	=	0	(106)
-			ment for							1	1	1 1		
(107)m=	0	0	0	0	0	41.64	56.35	40.02	0	0	0	0		_
									Tota	= Sum(	1.0.7)	=	138.01	(107)
Space	cooling	require	ment in k	رWh/m²/	year				(107)	(4) =			1.92	(108)
8f. Fat	oric Ene	rgy Effic	iency (ca	alculated	l only un	der spe	cial cond	litions, s	ee sectio	on 11)				
Fabri	c Energ	y Efficie	ncy						(99)	+ (108) =	=		50.61	(109)
Targe	et Fabri	c Energ	y Efficie	ency (TF	EE)								58.2	(109)

			Hearl	Details:						
Accesses Names	John Ashe		03011		a Nivera	<b>b</b> a # .		CTDO	024269	
Assessor Name: Software Name:	Stroma FSA	AP 2012			a Num are Vei				0031268 on: 1.0.5.8	
Contware Name.	Otroma i Or		Property	Address			PETTS W			
Address :										
1. Overall dwelling dim	ensions:									
0				ea(m²)	L		ight(m)	٦,_ ,	Volume(m <sup>3</sup>	_
Ground floor				71.94	(1a) x	2	.66	(2a) =	191.36	(3a)
Total floor area TFA = (	1a)+(1b)+(1c)+(1	Id)+(1e)+(	1n)	71.94	(4)					
Dwelling volume					(3a)+(3b	)+(3c)+(3d	l)+(3e)+	.(3n) =	191.36	(5)
2. Ventilation rate:				_						
	main heating	seconda heating		other		total			m³ per hou	r
Number of chimneys	0	+ 0	+	0	= [	0	X 4	40 =	0	(6a)
Number of open flues	0	+ 0	+	0	= [	0	x 2	20 =	0	(6b)
Number of intermittent f	ans					3	x '	10 =	30	(7a)
Number of passive vent	S				F	0	x -	10 =	0	(7b)
Number of flueless gas	fires				F	0	X 4	40 =	0	(7c)
5										
								Air ch	nanges per ho	ur
Infiltration due to chimne	eys, flues and fa	ns = (6a) + (6b) +	(7a)+(7b)+	·(7c) =	Г	30		÷ (5) =	0.16	(8)
If a pressurisation test has			ed to (17),	otherwise (	continue fr	om (9) to (	(16)			_
Number of storeys in Additional infiltration	the dwelling (ns)						r(0)	41.04	0	(9)
Structural infiltration:	0.25 for steel or t	timber frame (	or 0 35 fc	or macon	ry constr	ruction	[(9)	-1]x0.1 =	0	(10)
if both types of wall are					•	uction			0	(11)
deducting areas of open	• ,									_
If suspended wooden		` ,	0.1 (seal	ed), else	enter 0				0	(12)
If no draught lobby, e	·								0	(13)
Percentage of windov Window infiltration	vs and doors dra	iugrii sirippeu		0.25 - [0.2	2 x (14) ÷ 1	001 =			0	(14)
Infiltration rate				•	. ,	12) + (13) -	+ (15) =		0	(16)
Air permeability value	, q50, expressed	d in cubic met	es per h	our per s	quare m	etre of e	nvelope	area	5	(17)
If based on air permeab			•	•	•		·		0.41	(18)
Air permeability value appl		n test has been d	one or a de	egree air pe	rmeability	is being u	sed			
Number of sides shelter	red			(20) – 1	[0.075 x (1	10)1 -			0	(19)
Shelter factor Infiltration rate incorpora	ating chalter fact	or		(20) = 1 (21) = $(18)$		19)] =			1	(20)
Infiltration rate modified	•			(21) = (10	) X (20) =				0.41	(21)
Jan Feb	Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec	]	
Monthly average wind s			1 001	1 / 109	_ оор	1 000	1 1404	1 200	l	
(22)m= 5.1 5	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7	]	
, ,		1	1	1	<u> </u>	1	1	<u> </u>	J	
Wind Factor (22a)m = (2	22)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		

Adjusted infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m					
0.52	0.51	0.5	0.45	0.44	0.39	0.39	0.38	0.41	0.44	0.46	0.48		
Calculate effe		_	rate for t	he appli	cable ca	se	!	<u>.                                    </u>				<u> </u>	
If mechanical If exhaust air h			andiv N (2	3h) - (23a	) × Emy (e	aguation (1	VSV) othe	nwica (23h	n) = (23a)			0	(23a
If balanced with									) – (23a)			0	(23b
		•	•	J		,		,	2h\m + (1	22h) v [	1 (22a)	0	(230
a) If balance (24a)m= 0		o 0	0	0	0	o (IVIVI	0	0	0	230) <b>x</b> [	0	+ 100j	(24a
b) If balance											ľ	l	(=
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0	1	(24b
c) If whole h						<u> </u>		<u> </u>				l	
,	n < 0.5 ×				•				.5 × (23b	)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(240
d) If natural	ventilation	on or wh	ole hous	e positiv	/e input	ventilatio	on from I	oft	<u>!</u>			1	
,	m = 1, the			•	•				0.5]			_	
(24d)m = 0.63	0.63	0.62	0.6	0.6	0.57	0.57	0.57	0.58	0.6	0.6	0.61		(240
Effective air	change	rate - er	iter (24a	) or (24b	o) or (24	c) or (24	d) in box	(25)				_	
(25)m= 0.63	0.63	0.62	0.6	0.6	0.57	0.57	0.57	0.58	0.6	0.6	0.61		(25)
3. Heat losse	s and he	eat loss i	paramet	ōt.									
ELEMENT	Gros	·	Openin		Net Ar	ea	U-valı	IE.	AXU		k-value	<u>.</u>	ΑΧk
LLLIVILIAI	area	_	m		A ,r		W/m2		(W/ł	<)	kJ/m²·ł		kJ/K
Windows Type	e 1				21.28	x1	/[1/( 0.9 )+	0.04] =	18.49				(27)
Windows Type	e 2				4.52	x1	/[1/( 0.9 )+	0.04] =	3.93	$\equiv$			(27)
Floor					71.94	x	0.13	□ = i	9.3522	<b>=</b> 1		$\neg \vdash$	(28)
Walls	57.6	64	25.8		31.84	x x	0.15	<del>-</del>	4.78	₹ i		<b>i</b> i	(29)
Total area of e	elements	 , m²			129.5	8							(31)
* for windows and	d roof wind	ows, use $\epsilon$	ffective wi	ndow U-va	alue calcul	<b></b> ated using	g formula 1	/[(1/U-valu	ıe)+0.04] a	s given ir	n paragraph	1 3.2	, ,
** include the area	as on both	sides of in	iternal wal	ls and par	titions								
Fabric heat los	ss, W/K =	= S (A x	U)				(26)(30)	+ (32) =				36.54	(33)
Heat capacity	Cm = S(	Axk)						((28).	(30) + (32	2) + (32a)	(32e) =	9823.8	(34)
Thermal mass	parame	ter (TMF	P = Cm -	- TFA) ir	n kJ/m²K			Indica	tive Value:	Low		100	(35)
For design assess				construct	ion are no	t known pr	ecisely the	indicative	e values of	TMP in T	able 1f		
can be used inste Thermal bridg				icina An	nandiy l							40.44	(26)
if details of therma	`	,		• .	•	`						19.44	(36)
ii dotano oi triorrit		aro not nii	own (00) -	- 0.00 x (0	')			(33) +	(36) =			55.98	(37)
Total fabric he			اطلعمما	/				(38)m	= 0.33 × (	25)m x (5	)		``
Total fabric he	at loss ca	alculatec	i monuni				1	· ` ´	<u> </u>		1		
Total fabric he			<u> </u>		Jun	Jul	l Aua	Sep	I Oct	l Nov	I Dec		
Total fabric he	Feb	Mar 39.41	Apr 37.9	May 37.61	Jun 36.29	Jul 36.29	Aug 36.04	Sep 36.8	Oct 37.61	Nov 38.19	Dec 38.79	1	(38)
Total fabric her  Ventilation her  Jan  (38)m= 40.07	Feb 39.74	Mar 39.41	Apr	May			<del>–</del>	36.8	37.61	38.19	+		(38)
Ventilation hea  Jan  (38)m= 40.07  Heat transfer of	Feb 39.74 coefficier	Mar 39.41 nt, W/K	Apr 37.9	May 37.61	36.29	36.29	36.04	36.8 (39)m	37.61	38.19 38)m	38.79	<b>]</b> 1	(38)
Total fabric her  Ventilation her  Jan  (38)m= 40.07	Feb 39.74	Mar 39.41	Apr	May			<del>–</del>	36.8 (39)m 92.78	37.61 = (37) + (3 93.59	38.19 38)m 94.16	38.79 94.77	93.87	
Ventilation hea  Jan  (38)m= 40.07  Heat transfer of	Feb 39.74 coefficier 95.72	Mar 39.41 nt, W/K 95.39	Apr 37.9 93.87	May 37.61	36.29	36.29	36.04	36.8 (39)m 92.78	37.61	38.19 38)m 94.16 Sum(39)	38.79 94.77	93.87	(38)
Total fabric her  Ventilation her  Jan  (38)m= 40.07  Heat transfer (39)m= 96.05	Feb 39.74 coefficier 95.72	Mar 39.41 nt, W/K 95.39	Apr 37.9 93.87	May 37.61	36.29	36.29	36.04	36.8 (39)m 92.78	37.61 = (37) + (3 93.59 Average =	38.19 38)m 94.16 Sum(39)	38.79 94.77	93.87	

Number of days in month (Table 1a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	iter heat	ing ener	gy requi	rement:								kWh/ye	ear:	
if TF			N + 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)	)2)] + 0.0	0013 x (T	ΓFA -13.		29		(42)
Reduce	the annua	l average	ater usag hot water person per	usage by	5% if the a	welling is	designed t			se target o		.64		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
İ			day for ea				Table 1c x						Ī	
(44)m=	97.51	93.96	90.41	86.87	83.32	79.78	79.78	83.32	86.87	90.41	93.96	97.51		<b>–</b>
Energy o	content of	hot water	used - cal	culated mo	onthly = 4.	190 x Vd,r	n x nm x D	)Tm / 3600			m(44) <sub>112</sub> = ables 1b, 1		1063.7	(44)
(45)m=	144.6	126.47	130.5	113.78	109.17	94.21	87.3	100.17	101.37	118.14	128.95	140.04		_
If instant	taneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		Γotal = Su	m(45) <sub>112</sub> =	=	1394.68	(45)
(46)m=	0	0	0	0	0	0	0	0	0	0	0	0		(46)
	storage							***						
•		, ,	includin				_		ame ves	sel		0		(47)
Otherw	vise if no	stored	nd no ta hot wate		-			' '	ers) ente	er '0' in (	47)			
	storage anufact		eclared l	oss facto	or is kno	wn (kWh	n/day):					0		(48)
Tempe	rature fa	actor fro	m Table	2b								0		(49)
• • • • • • • • • • • • • • • • • • • •			storage	-				(48) x (49)	) =			0		(50)
			eclared of factor fr	-								0		(51)
		-	ee secti		0 2 (	1,11110,00	· <b>y</b> /					U		(01)
		from Tal										0		(52)
Tempe	erature fa	actor fro	m Table	2b								0		(53)
• • • • • • • • • • • • • • • • • • • •			storage	, kWh/ye	ear			(47) x (51)	x (52) x (	53) =	-	0		(54)
	` ' '	54) in (5	•	. ما م م م م				((EC) (	EE) (44)	_	(	0		(55)
ı			culated f					((56)m = (			I .		1	(50)
(56)m=	0	0 dedicated	0 d solar sto	0 rage (57):	0 m = (56)m	0	0 H11)] ÷ (5)	0 0) else (5	0 7)m = (56)	0 m where (	0 H11) is fro	m Annend	liv H	(56)
				- , ,	` '	-	,- ,	· ·	, , ,	,				(E7)
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
	-		inual) fro			F0) /	(FO) - OC	NE (44)				0		(58)
	•		culated from Tab		•		,	, ,		r thermo	stat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss cal	culated	for each	month (	(61)m =	(60) ÷ 36	65 × (41)	)m						
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat	required for	water he	eating ca	alculated	l fo	r each mont	h (62)	)m =	0.85 × (	45)m -	- (46)m +	(57)m +	(59)m + (61)m	
(62)m= 122	2.91 107.5	110.93	96.71	92.79	8	0.07 74.2	85	.15	86.16	100.42	109.61	119.03		(62)
Solar DHW in	nput calculated	using App	endix G oı	Appendix	Н(	negative quant	ity) (en	iter '0	' if no solar	r contrib	ution to wate	er heating)		
(add addit	ional lines if	FGHRS	and/or \	WWHRS	ар	plies, see A	ppen	dix C	G)				-	
(63)m=	0 0	0	0	0		0 0		0	0	0	0	0		(63)
Output fro	m water hea	ter											_	
(64)m= 122	2.91 107.5	110.93	96.71	92.79	8	0.07 74.2	85	.15	86.16	100.42	109.61	119.03		_
								Outp	out from wa	ater heat	er (annual)₁	12	1185.48	(64)
Heat gains	s from water	heating,	kWh/m	onth 0.2	5 ′	[0.85 × (45)	m + (6	61)m	n] + 0.8 x	(46)n	n + (57)m	+ (59)m	<u>l</u> ]	
(65)m= 30	).73 26.87	27.73	24.18	23.2	2	0.02 18.55	21	.29	21.54	25.1	27.4	29.76	]	(65)
include	(57)m in cald	culation o	of (65)m	only if c	ylir	der is in the	dwe	lling	or hot wa	ater is	from com	munity ł	neating	
5. Interna	al gains (see	e Table 5	and 5a	):										
Metabolic	gains (Table	e 5), Wat	ts										_	
J	an Feb	Mar	Apr	May	,	Jun Jul	A	lug	Sep	Oct	Nov	Dec		
(66)m= 114	4.61 114.61	114.61	114.61	114.61	11	4.61 114.61	114	4.61	114.61	114.61	114.61	114.61		(66)
Lighting ga	ains (calcula	ted in Ap	pendix	L, equat	ion	L9 or L9a),	also	see -	Table 5			-	_	
(67)m= 17	7.99 15.98	12.99	9.84	7.35	6	6.71	8.	72	11.7	14.86	17.34	18.49	]	(67)
Appliances	s gains (calc	ulated in	Append	dix L, eq	uat	ion L13 or L	13a),	alsc	see Tal	ole 5	-		_	
(68)m= 20°	1.78 203.88	198.6	187.37	173.19	15	9.86 150.96	148	3.86	154.14	165.37	179.55	192.88	]	(68)
Cooking g	ains (calcula	ated in A	opendix	L, equa	tion	L15 or L15	a), als	so se	ee Table	5	•		•	
(69)m= 34	34.46	34.46	34.46	34.46	3	4.46 34.46	34	.46	34.46	34.46	34.46	34.46	]	(69)
Pumps an	d fans gains	(Table 5	 5a)	•	•	•	•				•	•	•	
(70)m=	0 0	0	0	0		0 0		0	0	0	0	0	]	(70)
Losses e.g	g. evaporatio	n (negat	ive valu	es) (Tab	le t						•	•	•	
(71)m= -91	1.69 -91.69	-91.69	-91.69	-91.69	-9	1.69 -91.69	-91	1.69	-91.69	-91.69	-91.69	-91.69	]	(71)
Water hea	ting gains (T	rable 5)		•		•					•		•	
(72)m= 4°	1.3 39.99	37.27	33.58	31.18	2	27.8 24.93	28	.61	29.92	33.74	38.06	40	]	(72)
Total inte	rnal gains =				_	(66)m + (67)	m + (6	8)m +	+ (69)m + (	70)m +	(71)m + (72)	m	•	
(73)m= 318	8.46 317.23	306.25	288.17	269.11	25	51.26 239.98	243	3.58	253.14	271.36	292.34	308.75	]	(73)
6. Solar g	gains:												4	
Solar gains	are calculated	using sola	r flux from	Table 6a	and	associated equ	uations	to co	nvert to th	e applica	able orientat	ion.		
Orientation	n: Access F		Area			Flux			g		FF		Gains	
	Table 6d		m²			Table 6a		I	able 6b		Table 6c		(W)	
North 0	0.77	Х	21.	28	x	10.63	X		0.63	х	0.7	=	69.15	(74)
North 0	0.77	X	21.	28	x	20.32	X		0.63	X	0.7	=	132.16	(74)
North 0	0.77 0.77	X	21.	28	x	34.53	X		0.63	x	0.7	=	224.57	(74)
North 0	).9x 0.77	x	21.	28	x	55.46	X		0.63	х	0.7	=	360.71	(74)
North 0	0.77 0.77	Х	21.	28	x	74.72	X		0.63	x	0.7	=	485.91	(74)
North 0	0.77	X	21.	28	x	79.99	X		0.63	x	0.7	=	520.18	(74)
North 0	0.77	X	21.	28	x	74.68	X		0.63	x	0.7	=	485.65	(74)
North 0	0.77	х	21.	28	x	59.25	x		0.63	x	0.7	=	385.31	(74)
					•		_							_

North	0.9x	0.77	X	21.	28	X	4	1.52	X	0.63	X	0.7	=	270	(74)
North	0.9x	0.77	x	21.	28	X	2	4.19	x	0.63	X	0.7	=	157.31	(74)
North	0.9x	0.77	X	21.	28	X	1	3.12	x	0.63	X	0.7	=	85.31	(74)
North	0.9x	0.77	x	21.	28	X	8	3.86	x	0.63	x	0.7	=	57.65	(74)
West	0.9x	0.77	X	4.5	52	X	1	9.64	x	0.63	x	0.7	=	27.13	(80)
West	0.9x	0.77	X	4.5	52	X	3	8.42	x	0.63	x	0.7	=	53.07	(80)
West	0.9x	0.77	х	4.5	52	X	6	3.27	x	0.63	x	0.7	=	87.4	(80)
West	0.9x	0.77	X	4.5	52	X	9	2.28	x	0.63	x	0.7	=	127.47	(80)
West	0.9x	0.77	X	4.5	52	X	1	13.09	x	0.63	X	0.7	=	156.22	(80)
West	0.9x	0.77	X	4.5	52	X	1	15.77	x	0.63	x	0.7	=	159.92	(80)
West	0.9x	0.77	X	4.5	52	X	1	10.22	x	0.63	x	0.7	=	152.25	(80)
West	0.9x	0.77	X	4.5	52	X	9	4.68	x	0.63	X	0.7	=	130.78	(80)
West	0.9x	0.77	X	4.5	52	X	7	3.59	x	0.63	x	0.7	=	101.65	(80)
West	0.9x	0.77	X	4.5	52	X	4	5.59	x	0.63	x	0.7	=	62.98	(80)
West	0.9x	0.77	х	4.5	52	X	2	4.49	x	0.63	x	0.7	=	33.83	(80)
West	0.9x	0.77	X	4.5	52	X	1	6.15	x	0.63	x	0.7	=	22.31	(80)
Solar o	ains in	watts, ca	alculated	for eac	h month	า			(83)m	n = Sum(74)m .	(82)m				
(83)m=	96.28	185.23	311.97	488.18	642.13	$\neg$	80.1	637.91	516	<del></del>	220.2		79.96	1	(83)
` '	ains – i	nternal a	ınd solar	(84)m =	<u>l</u> = (73)m	+ (	83)m	. watts	<u> </u>		<u> </u>		<u> </u>	1	
(84)m=	414.74	502.46	618.22	776.35	911.24	<del>-</del>	31.36	877.89	759	.67 624.8	491.6	5 411.48	388.71	1	(84)
7 Ma	an inter	nol tom		/1	ı						l		l	1	
						$\sim$ 1									
				(heating			oron i	from Tok	olo O	Th4 (°C)					7(05)
Temp	erature	during h	eating p	eriods ir	n the liv	ing			ole 9	, Th1 (°C)				21	(85)
Temp	erature	during h	eating p	eriods ir iving are	n the liv ea, h1,n	ing n (s	ее Та	ble 9a)					T _	21	(85)
Temp Utilisa	erature ation fac Jan	during heter for g	neating p ains for l Mar	eriods ir iving are Apr	n the liv ea, h1,n May	ing n (s	ee Ta Jun	ble 9a) Jul	Α	ug Sep	Ос	+	Dec	21	
Temp	erature	during h	eating p	eriods ir iving are	n the liv ea, h1,n	ing n (s	ее Та	ble 9a)		ug Sep	Oc 0.9	t Nov 0.96	Dec 0.97	21	(85)
Temp Utilisa (86)m=	erature ation fac Jan 0.97	during heter for grant Feb	neating p ains for I Mar 0.91	eriods ir iving are Apr 0.83	n the livea, h1,n May	ing n (s	ee Ta Jun <sup>0.54</sup>	ble 9a) Jul 0.42	A 0.4	ug Sep		+		21	
Temp Utilisa (86)m=	erature ation fac Jan 0.97	during heter for grant Feb	neating p ains for I Mar 0.91	eriods ir iving are Apr 0.83	n the livea, h1,n May	ing n (s	ee Ta Jun <sup>0.54</sup>	ble 9a) Jul 0.42	A 0.4	ug Sep 19 0.72 Table 9c)		0.96		21	
Temp Utilisa (86)m= Mean (87)m=	Jan 0.97 interna	during heter for games feb 0.95 ltemper 18.52	neating p ains for I Mar 0.91 ature in	eriods ir iving are Apr 0.83 living are	n the livea, h1,n May 0.69 ea T1 (f	ing n (s follo	Jun 0.54 ow ste	Jul 0.42 ps 3 to 7 20.92	A 0.47 in T 20.	ug Sep 19 0.72 Table 9c) 88 20.55	0.9	0.96	0.97	21	(86)
Temp Utilisa (86)m= Mean (87)m=	Jan 0.97 interna	during heter for games feb 0.95 ltemper 18.52	neating p ains for I Mar 0.91 ature in	eriods ir iving are Apr 0.83 living are	n the livea, h1,n May 0.69 ea T1 (f	ing n (s follo	Jun 0.54 ow ste	Jul 0.42 ps 3 to 7 20.92	A 0.47 in T 20.	ug Sep 19 0.72 Table 9c) 88 20.55 9, Th2 (°C)	0.9	0.96	0.97	21	(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m=	erature Ation fac Jan 0.97 interna 18.2 erature 19.81	during heter for games Feb 0.95 l temper 18.52 during h	neating p ains for I Mar 0.91 ature in 19.09 neating p	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of	n (s	ee Ta Jun 0.54 ow ste 20.79 velling	Jul 0.42 ps 3 to 7 20.92 from Ta	A 0.47 in T 20.	ug Sep 19 0.72 Table 9c) 88 20.55 9, Th2 (°C)	0.9	0.96	0.97	21	(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa	erature ation fac Jan 0.97 interna 18.2 erature 19.81 ation fac	during heter for games from 18.52 during heter for games from games from games from games from for games from for games from for games from for games from for games from from games from from games from from games from from games from from games from gam	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling,	ing (s) (s) (s) (s) (s) (s) (s) (s) (s) (s)	ee Ta Jun 0.54 ow ste 20.79 /elling 19.85 ,m (se	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table	A 0.47 in T 20.48ble 9 19.	ug Sep 19 0.72  Table 9c) 88 20.55 9, Th2 (°C) 86 19.85	0.9 19.74	0.96 4 18.85 4 19.83	0.97 18.15 19.83	21	(86) (87) (88)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	erature ation fac Jan 0.97 interna 18.2 erature 19.81 ation fac 0.97	during heter for gase to see the during heter for gase the during heter for gase to see the during heter for gase the dur	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 eest of d	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64	ing m (s	Jun 0.54 ow ste 20.79 velling 19.85 ,m (se 0.46	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33	A 0.47 in T 20.48 in 19.49 19.	ug Sep 19 0.72  Table 9c) 88 20.55 9, Th2 (°C) 86 19.85	0.9 19.74 19.84	0.96	0.97	21	(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean	erature Jan 0.97 interna 18.2 erature 19.81 ation fac	during heter for games  Feb  0.95  I temper  18.52  during heter for games  0.95  I temper	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9 ature in	eriods in iving are 0.83 living are 19.84 eriods in 19.84 eest of do 0.8 the rest	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel	ing n (s following following) following following following for the following followin	ee Ta Jun 0.54  ow ste 20.79  velling 19.85  ,m (se 0.46	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste	A 0.4 7 in T 20. 19. 9a) 0.3	ug Sep 19 0.72  Table 9c) 88 20.55  9, Th2 (°C) 86 19.85  19 0.65  to 7 in Table	0.9 19.7 <sup>2</sup> 19.8 <sup>2</sup> 0.87 e 9c)	0.96 4 18.85 4 19.83 0.95	0.97 18.15 19.83		(86) (87) (88) (89)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	erature ation fac Jan 0.97 interna 18.2 erature 19.81 ation fac 0.97	during heter for gase to see the during heter for gase the during heter for gase to see the during heter for gase the dur	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 eest of d	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64	ing n (s following following) following following following for the following followin	Jun 0.54 ow ste 20.79 velling 19.85 ,m (se 0.46	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33	A 0.47 in T 20.48 in 19.49 19.	ug Sep 9 0.72  Table 9c) 88 20.55 9, Th2 (°C) 86 19.85  to 7 in Table 8 19.55	0.9 19.74 19.84 0.87 e 9c) 18.8	0.96 1 18.85 1 19.83 0.95	0.97 18.15 19.83 0.97		(86) (87) (88) (89)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean	erature Jan 0.97 interna 18.2 erature 19.81 ation fac	during heter for games  Feb  0.95  I temper  18.52  during heter for games  0.95  I temper	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9 ature in	eriods in iving are 0.83 living are 19.84 eriods in 19.84 eest of do 0.8 the rest	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel	ing n (s following following) following following following for the following followin	ee Ta Jun 0.54  ow ste 20.79  velling 19.85  ,m (se 0.46	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste	A 0.4 7 in T 20. 19. 9a) 0.3	ug Sep 9 0.72  Table 9c) 88 20.55 9, Th2 (°C) 86 19.85  to 7 in Table 8 19.55	0.9 19.74 19.84 0.87 e 9c) 18.8	0.96 4 18.85 4 19.83 0.95	0.97 18.15 19.83 0.97	21	(86) (87) (88) (89)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m=	erature ation fac  Jan 0.97 interna 18.2 erature 19.81 ation fac 0.97 interna 17.27	during heter for gase of the second s	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9 ature in 1	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 est of de 0.8 the rest 18.88	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel 19.42	ing (s) (s) (s) (s) (s) (s) (s) (s) (s) (s)	ee Ta Jun 0.54  ow ste 20.79  velling 19.85  ,m (se 0.46  T2 (fo	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow stern 19.82	A 0.4 0.4 19. 19. 19. 19. 19. 19. 19. 19. 19. 19.	ug Sep 9 0.72  Table 9c) 88 20.55 9, Th2 (°C) 86 19.85  to 7 in Table 8 19.55	0.9 19.74 19.84 0.87 e 9c) 18.8	0.96 1 18.85 1 19.83 0.95	0.97 18.15 19.83 0.97		(86) (87) (88) (89)
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Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m=	erature ation fac  Jan 0.97 interna 18.2 erature 19.81 ation fac 0.97 interna 17.27 interna 17.27	during heter for games from 18.52 during heter for games from 17.59 during heter for games from 17.59 during heter for games from 18.16	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9 ature in 18.15	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 est of de 0.8 the rest 18.88 r the wh	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel 19.42	ing (s) follow f	ee Ta Jun 0.54  ow ste 20.79  velling 19.85  ,m (se 0.46  T2 (fo 19.73  g) = fl 20.38	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste 19.82  A × T1 20.5	A A 0.4 1 20. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19	ug Sep  9 0.72  able 9c)  88 20.55  9, Th2 (°C)  86 19.85  to 7 in Table  8 19.55  - fLA) × T2	0.9 19.74 19.84 0.87 e 9c) 18.84 19.39	0.96  1 18.85  1 19.83  0.95  1 17.93  ving area ÷ (	0.97 18.15 19.83 0.97 17.24 4) =		(86) (87) (88) (89) (90) (91)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m=	erature ation fac  Jan 0.97 interna 18.2 erature 19.81 ation fac 0.97 interna 17.27 interna 17.27	during heter for games from 18.52 during heter for games from 17.59 during heter for games from 17.59 during heter for games from 18.16	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9 ature in 18.15	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 est of de 0.8 the rest 18.88 r the wh	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel 19.42	ing  n (s  follo  2  f dw  h2  lling  1  ratu	ee Ta Jun 0.54  ow ste 20.79  velling 19.85  ,m (se 0.46  T2 (fo 19.73  g) = fl 20.38	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste 19.82  A × T1 20.5	A A 0.4 1 20. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19	ug Sep  9 0.72  able 9c)  88 20.55  9, Th2 (°C)  86 19.85  to 7 in Table  8 19.55  - fLA) × T2  47 20.17  where approximation	0.9 19.74 19.84 0.87 e 9c) 18.84 19.39	0.96  1 18.85  1 19.83  0.95  1 17.93  ving area ÷ (-	0.97 18.15 19.83 0.97 17.24 4) =		(86) (87) (88) (89) (90) (91)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m=  Mean (92)m= Apply (93)m=	erature ation factors Jan 0.97 interna 18.2 erature 19.81 ation factors 0.97 interna 17.27 interna 17.84 adjustr 17.84	during heter for gase of the second s	neating properties of the mean reading properties of the mean	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 rest of dr 0.8 the rest 18.88 r the wh 19.47 interna 19.47	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel 19.42 cole dwe 20.05 I tempe	ing  n (s  follo  2  f dw  h2  lling  1  ratu	ee Ta  Jun  0.54  ow ste  20.79  velling  19.85  ,m (se  0.46  T2 (fo  19.73  g) = fl  20.38  ure fro	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste 19.82  A × T1 20.5 m Table	A A 0.47 in T 20. able 9 9a) 0.3 19 + (1 20. 44e,	ug Sep  9 0.72  able 9c)  88 20.55  9, Th2 (°C)  86 19.85  to 7 in Table  8 19.55  - fLA) × T2  47 20.17  where approximation	0.9  19.74  19.84  0.87  e 9c)  18.87  fLA = Li  19.39  ppriate	0.96  1 18.85  1 19.83  0.95  1 17.93  ving area ÷ (-	0.97 18.15 19.83 0.97 17.24 4) =		(86) (87) (88) (89) (90) (91) (92)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spi	interna 17.27  interna 17.27  interna 17.27	during heter for garage from 18.52 during heter for garage from 19.82 during heter for garage from 17.59 decided from 18.16 ment to the string requirement into the string	neating prains for I Mar 0.91 ature in 19.09 neating prains for I 0.9 ature in 18.15 ature (for 18.73 he mean 18.73 uirement ternal ter	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 rest of d 0.8 the rest 18.88 r the wh 19.47 internal 19.47	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel 19.42 cole dwe 20.05 I tempe 20.05	ing  m (s  follo  follo  follo  g  fling  1  fling  ratu  2	ee Ta  Jun  0.54  ow ste  20.79  velling  19.85  ,m (se  0.46  172 (fo  19.73  g) = fl  20.38  ure fro  20.38	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste 19.82  A × T1 20.5 m Table 20.5	A A 0.47 in T 20. able 9 19. 19. 19. 19. 19. 19. 19. 19. 19. 1	ug Sep  9 0.72  able 9c)  88 20.55  9, Th2 (°C)  86 19.85  to 7 in Table  8 19.55  - fLA) × T2  47 20.17  where approximation	0.9  19.74  19.84  0.87  e 9c)  18.87  fLA = Li  19.39  ppriate  19.39	0.96  1 18.85  1 19.83  0.95  1 17.93  ving area ÷ (	0.97  18.15  19.83  0.97  17.24  4) =	0.62	(86) (87) (88) (89) (90) (91) (92)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spi	interna 17.27  interna 17.27  interna 17.27	during heter for garage from 18.52 during heter for garage from 19.82 during heter for garage from 17.59 decided from 18.16 ment to the string requirement into the string	neating p ains for I Mar 0.91 ature in 19.09 neating p 19.82 ains for I 0.9 ature in 18.15 ature (fo 18.73 he mean 18.73 uirement	eriods ir iving are Apr 0.83 living are 19.84 eriods ir 19.84 rest of d 0.8 the rest 18.88 r the wh 19.47 internal 19.47	n the livea, h1,n May 0.69 ea T1 (f 20.43 n rest of 19.84 welling, 0.64 of dwel 19.42 cole dwe 20.05 I tempe 20.05	ing  m (s  follo  follo  follo  g  fling  1  fling  ratu  2	ee Ta  Jun  0.54  ow ste  20.79  velling  19.85  ,m (se  0.46  172 (fo  19.73  g) = fl  20.38  ure fro  20.38	Jul 0.42 ps 3 to 7 20.92 from Ta 19.85 ee Table 0.33 ollow ste 19.82  A × T1 20.5 m Table 20.5	A A 0.47 in T 20. able 9 19. 19. 19. 19. 19. 19. 19. 19. 19. 1	ug Sep  9 0.72  Table 9c)  88 20.55  9, Th2 (°C)  86 19.85  19.55  to 7 in Table  8 19.55  - fLA) × T2  47 20.17  where approach	0.9  19.74  19.84  0.87  e 9c)  18.87  fLA = Li  19.39  ppriate  19.39	0.96  1 18.85  1 19.83  0.95  1 17.93  ving area ÷ (	0.97  18.15  19.83  0.97  17.24  4) =	0.62	(86) (87) (88) (89) (90) (91) (92)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilisation factor for	gains, hm:										
(94)m= 0.95 0.93	0.88	0.79 0.65	0.5	0.38	0.44	0.67	0.86	0.94	0.96		(94)
Useful gains, hmGm	, W = (94)m	n x (84)m								l	
(95)m= 395.89 467.89	546.46 61	12.04 593.86	465.13	334.44	337.47	419.24	423.01	385.43	373.27		(95)
Monthly average ext	ernal tempe	rature from Ta	able 8							l	
(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 internal t	temperature,	Lm , W =	=[(39)m :	x [(93)m·	– (96)m	]			•	
(97)m= 1300.71 1269.48	1166.42 99	92.26 781.24	533.61	359.56	374.23	562.7	822.3	1073.16	1289.03		(97)
Space heating requi	rement for e	ach month, k\	Wh/mon	th = 0.02	24 x [(97)	)m – (95	)m] x (4 <sup>-</sup>	1)m			
(98)m= 673.18 538.67	461.25 27	73.76 139.41	0	0	0	0	297.07	495.17	681.32		
		-			Tota	l per year	(kWh/year	) = Sum(9	8) <sub>15,912</sub> =	3559.84	(98)
Space heating requi	rement in kV	Vh/m²/year								49.48	(99)
8c. Space cooling re	quirement										
Calculated for June,	July and Au	igust. See Tal	ole 10b								
Jan Feb		Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat loss rate Lm (c	alculated usi	ing 25°C inter	nal temp	perature	and exte	ernal ten	nperatur	e from T	able 10)		
(100)m= 0 0	0	0 0	867.32	682.78	699.37	0	0	0	0		(100)
Utilisation factor for	oss hm	•								•	
(101)m= 0 0	0	0 0	0.81	0.86	0.82	0	0	0	0		(101)
Useful loss, hmLm (	Natts) = (10	0)m x (101)m								•	
(102)m= 0 0	0	0 0	700.3	584.07	570.36	0	0	0	0		(102)
Gains (solar gains c	alculated for	applicable we	eather re	egion, se	e Table	10)					
(103)m= 0 0	0	0 0	1173.74	1109.51	972.7	0	0	0	0		(103)
Space cooling requi			lwelling,	continue	ous ( kW	h = 0.0	24 x [(10	03)m – (	102)m ] x	x (41)m	
set (104)m to zero if	(104)m < 3	× (98)m		1	T	1		ı		1	
(104)m = 0 0	0	0 0	340.88	390.93	299.34	0	0	0	0		_
							= Sum(	•	=	1031.15	(104)
Cooled fraction	- L L - 40L \					f C =	cooled	area ÷ (4	1) =	1	(105)
Intermittency factor (7	1 i		0.05	0.05	0.05					1	
(106)m= 0 0	0	0 0	0.25	0.25	0.25	0	0	0	0		<b>¬</b>
Space cooling require	ament for mo	onth – (104)m	v (105)	√ (106)r	n	I ota	' = Sum(	104)	=	0	(106)
$\frac{\text{3pace cooling require}}{(107)\text{m}} = 0 \qquad 0$	0	0 0	85.22	97.73	74.84	0	0	0	0		
(107)111-		0   0	00.22	37.73	74.04		= Sum(		=	257.79	(107)
		. / 0/					,	IaDar )	_		=
Space cooling require		•				` '	÷ (4) =			3.58	(108)
8f. Fabric Energy Effi	•	ulated only un	der spec	cial cond	litions, se		· ·				
Fabric Energy Efficie	ncy					(99)	+ (108) =	=		53.07	(109)

User Details: **Assessor Name:** John Ashe Stroma Number: STRO031268 Stroma FSAP 2012 **Software Version: Software Name:** Version: 1.0.5.8 Property Address: Unit 10 - COPPETTS WOOD, London Address: 1. Overall dwelling dimensions Area(m²) Av. Height(m) Volume(m³) Ground floor (1a) x (2a) = 191.36 (3a) 71.94 2.66 Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+....(1n)(4)71.94 Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+....(3n) =191.36 (5) total main secondary other m³ per hour heating heating x 40 =Number of chimneys (6a) 0 0 x 20 =Number of open flues 0 O O 0 0 (6b) Number of intermittent fans x 10 =(7a) 0 0 x 10 =Number of passive vents (7b) 0 0 x 40 =Number of flueless gas fires (7c)Air changes per hour Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = $\div$  (5) = (8) If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) (9) O Additional infiltration (10)[(9)-1]x0.1 =0 Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction (11)0 if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0 0 (12) If no draught lobby, enter 0.05, else enter 0 (13)O Percentage of windows and doors draught stripped (14)0 Window infiltration  $0.25 - [0.2 \times (14) \div 100] =$ 0 (15)Infiltration rate (8) + (10) + (11) + (12) + (13) + (15) =O (16)Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area (17)5 If based on air permeability value, then  $(18) = [(17) \div 20] + (8)$ , otherwise (18) = (16)0.25 (18)Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered (19)0  $(20) = 1 - [0.075 \times (19)] =$ Shelter factor (20)1  $(21) = (18) \times (20) =$ Infiltration rate incorporating shelter factor 0.25 (21)Infiltration rate modified for monthly wind speed Jan Feb Jul Sep Mar Apr Mav Jun Aug Oct Nov Dec Monthly average wind speed from Table 7 (22)m =5.1 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7 Wind Factor  $(22a)m = (22)m \div 4$ (22a)m 1.27 1.25 1.23 1.08 0.95 0.95 0.92 1 1.08 1.12 1.1 1.18

	ation rate (a	ıllowing	g for sh	elter an	d wind s	peed) =	(21a) x	(22a)m					
0.32		).31	0.28	0.27	0.24	0.24	0.23	0.25	0.27	0.28	0.29		
Calculate effect If mechanica		-	ite for ti	he applic	cable ca	se					ĺ	0.5	(23
If exhaust air he			dix N, (2	3b) = (23a	) × Fmv (e	equation (N	N5)) , other	wise (23b	) = (23a)			0.5	(23)
If balanced with				, ,	,	. `	,, .	,	, , ,			77.35	(23)
a) If balanced	•	•	•	ŭ		,	•		2h)m + ('	23h) 🗴 [	ا 1 <i>– (2</i> 3c)		(20
(24a)m= 0.43		0.42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41	. 100]	(24
b) If balance	L d mechanic	L cal ven	tilation	without	heat rec	coverv (N	<u>I</u> //∖/) (24b	)m = (22	2b)m + (2	L 23h)	ļ		
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole ho	use extrac	t venti	lation o	r positiv	e input v	rentilatio	n from c	utside			!		
,	$1 < 0.5 \times (23)$			•	•				5 × (23b	)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
d) If natural w	entilation o	or whol	le hous	e positiv	e input	ventilatio	on from I	oft				l	
if (22b)m	1 = 1, then (	(24d)m	n = (22b	)m othe	rwise (2	4d)m =	0.5 + [(2	2b)m² x	0.5]			ı	
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change rate	e - ente	er (24a	or (24b	o) or (24	c) or (24	d) in box	(25)			,	ı	
(25)m= 0.43	0.43 0	).42	0.39	0.38	0.35	0.35	0.34	0.36	0.38	0.39	0.41		(25
3. Heat losses	and heat l	oss na	aramete	zr.									
ELEMENT	Gross	·	Openin		Net Ar	ea	U-valı	IE.	AXU		k-value		λΧk
	area (m²		m		A ,r		W/m2		(W/ł	<)	kJ/m²-l		J/K
Windows Type	1				21.28	x1,	/[1/( 0.9 )+	0.04] =	18.49				(27
Windows Type	2				4.52	x1,	/[1/( 0.9 )+	0.04] =	3.93	=			(27
Floor					71.94	x	0.13	_ <u>-</u> i	9.3522	<b>=</b>			(28
Walls	57.64	7 [	25.8		31.84	x	0.15	╡┇	4.78	<b>=</b>		7 H	(29
Total area of el		_			129.5	=							` (31
* for windows and I	•		ective wii	ndow U-va			formula 1	/[(1/U-valu	ıe)+0.04] a	ıs given in	paragraph	3.2	(0.
** include the areas						J		-,	, -	Ū	, , ,		
Fabric heat loss	s, W/K = S	(A x U	J)				(26)(30)	+ (32) =				36.54	(33
Heat capacity 0	Cm = S(A x)	(k)						((28)	.(30) + (32	2) + (32a).	(32e) =	9823.8	(34
Thermal mass	parameter	(TMP :	= Cm ÷	TFA) in	kJ/m²K			Indica	tive Value:	Low		100	(35
For design assessi				constructi	on are not	t known pr	ecisely the	indicative	values of	TMP in T	able 1f		
	d of a detailed	d calcula	ation.			,							
	- 0 // \/	Λ 1 -	Tarta d									19.44	(36
Thermal bridge	`	,		• .	•	`						10.44	
Thermal bridge	l bridging are	,		• .	•	`		(33) +	(36) =				(37
Thermal bridge if details of thermal Total fabric hea	l bridging are a	not knov	wn (36) =	= 0.05 x (3	•	`			(36) = = 0.33 × (	25)m x (5	   	55.98	(37
Thermal bridge if details of thermal Total fabric hea  Ventilation hea	I bridging are and the loss the loss calcu	not knov	wn (36) = monthly	0.05 x (3	1)		Aug	(38)m	= 0.33 × (		1		(37
Thermal bridge if details of thermal Total fabric hea Ventilation hea	at loss t loss calcu	not knov ulated r Mar	wn (36) =	0.05 x (3 / May	Jun	Jul	Aug 21.75	(38)m Sep	= 0.33 × (	Nov	Dec 25.7		
Thermal bridge if details of thermal Total fabric hea Ventilation hea  Jan (38)m= 27.28	I bridging are at loss t loss calcu Feb 1 26.89 26	not know ulated r Mar 6.49	wn (36) = monthly Apr	0.05 x (3	1)		Aug 21.75	(38)m Sep 22.94	= 0.33 × ( Oct 24.12	Nov 24.91	Dec		
Thermal bridge if details of thermal Total fabric hea Ventilation hea  Jan (38)m= 27.28  Heat transfer co	I bridging are at loss t loss calcu Feb N 26.89 26	not know ulated r Mar 6.49	wn (36) = monthly Apr 24.52	May 24.12	Jun 22.15	Jul 22.15	21.75	(38)m Sep 22.94 (39)m	$= 0.33 \times (0.0000000000000000000000000000000000$	Nov 24.91 38)m	Dec 25.7		
	I bridging are at loss t loss calcu Feb N 26.89 26	not know ulated r Mar 6.49	wn (36) = monthly Apr	0.05 x (3 / May	Jun	Jul		(38)m Sep 22.94 (39)m 78.92	= 0.33 × (0.20	Nov 24.91 38)m 80.89	Dec 25.7	55.98	(38
Thermal bridge if details of thermal Total fabric hea Ventilation hea  Jan (38)m= 27.28  Heat transfer co	I bridging are at loss t loss calcu Feb N 26.89 26 0efficient, V 82.86 82	not known	monthly Apr 24.52	May 24.12	Jun 22.15	Jul 22.15	21.75	(38)m Sep 22.94 (39)m 78.92	$= 0.33 \times (0.0000000000000000000000000000000000$	Nov 24.91 38)m 80.89 Sum(39) <sub>1</sub>	Dec 25.7		
Thermal bridge  if details of thermal  Total fabric hea  Ventilation hea  Jan  (38)m= 27.28  Heat transfer co  (39)m= 83.26	I bridging are at loss It loss calcu Feb	not known	monthly Apr 24.52	May 24.12	Jun 22.15	Jul 22.15	21.75	(38)m Sep 22.94 (39)m 78.92	= 0.33 × (0 Oct 24.12 = (37) + (3 80.1 Average =	Nov 24.91 38)m 80.89 Sum(39) <sub>1</sub>	Dec 25.7	55.98	(38

Number of days in month (Table 1a)

Numbe	er of day	s in mor	ntn (Tab	ie Ta)					,				•	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
							•	•					•	
4 Wa	ater heat	ing ener	rgy requi	irement								kWh/ye	ear.	
11 110	ioi rioat		99 1094									Terring (		
	ed occu					(		\		40		29		(42)
	A > 13.9 A £ 13.9		+ 1.76 x	[1 - exp	(-0.0003	349 x (TI	-A -13.9	)2)] + 0.0	0013 x (	ΓFA -13.	9)			
		•	ater usad	ae in litre	es per da	av Vd.av	erage =	(25 x N)	+ 36		88	.64		(43)
									a water us	se target o		.0-1		(10)
not more	e that 125	litres per p	person per	<i>day (all</i> พ	ater use, l	hot and co	ld)							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water	er usage ir	n litres per	day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)						
(44)m=	97.51	93.96	90.41	86.87	83.32	79.78	79.78	83.32	86.87	90.41	93.96	97.51		
											m(44) <sub>112</sub> =		1063.7	(44)
Energy o	content of	hot water	used - cal	culated m	onthly = $4$ .	190 x Vd,ı	m x nm x E	OTm / 3600	) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)	_	
(45)m=	144.6	126.47	130.5	113.78	109.17	94.21	87.3	100.17	101.37	118.14	128.95	140.04		
					_					Total = Su	m(45) <sub>112</sub> =	=	1394.68	(45)
If instant	taneous w	ater heatii	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46	to (61)				1	
(46)m=	21.69	18.97	19.58	17.07	16.38	14.13	13.09	15.03	15.21	17.72	19.34	21.01		(46)
	storage		منام مان مانم		-lo \^	/\// IDC	-1	م ماطانین					Ī	(47)
•		, ,		•			•		ame ves	sei		0		(47)
	-	_	nd no ta		_				oral ante	or 'O' in (	47)			
	storage		not wate	וו כוווג) ול	iciudes i	nstantai	ieous cc	ווטט וטוווע	ers) ente	ei O iii (	47)			
	•		eclared I	oss fact	or is kno	wn (kWl	n/dav):					0		(48)
,			m Table			•	,					0	]	(49)
•			storage		aar			(48) x (49	<b>)</b> –					(50)
0,			eclared o			or is not		(40) X (49	) –		1	10		(50)
			factor fr	-							0.	02		(51)
If comr	munity h	eating s	ee secti	on 4.3									1	
	e factor										1.	03		(52)
Tempe	erature fa	actor fro	m Table	2b							0	.6		(53)
Energy	/ lost fro	m water	storage	, kWh/y	ear			(47) x (51	) x (52) x (	53) =	1.	03		(54)
Enter	(50) or (	54) in (5	55)								1.	03		(55)
Water	storage	loss cal	culated t	for each	month			((56)m = (	$(55) \times (41)$ ı	m				
(56)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinde	er contains	dedicated	d solar sto	rage, (57)	m = (56)m	x [(50) – (	H11)] ÷ (5	0), else (5	7)m = (56)	m where (	H11) is fro	m Append	lix H	
(57)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Drimor	v oirouit	loce (on	nual) fra	m Tabl	. 2	ļ	1	1	1			0	]	(58)
	•	•	nual) fro			59\m - i	(58) ± 36	65 × (41)	ım			0		(00)
	•				,	•	` '	, ,	a cylinde	r thermo	stat)			
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
					<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>				I	•
			for each	i	<del> </del>	<del></del>	· ·	1	_		_	_	1	(64)
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat red	uired for	water h	eating ca	alculated	for	each month	(62)	m = (	0.85 × (	45)m +	(46)m +	(57)m +	(59)m + (61)m	1
(62)m= 199.88	176.39	185.78	167.27	164.45	14	7.7 142.57	155	.45	154.86	173.41	182.45	195.31		(62)
Solar DHW input	calculated	using App	endix G o	Appendix	H (n	egative quantit	y) (ent	er '0'	if no solar	contribu	tion to wate	er heating)	-	
(add additiona	al lines if	FGHRS	and/or \	WWHRS	app	olies, see Ap	pend	lix G	)			-	_	
(63)m= 0	0	0	0	0		0	0		0	0	0	0		(63)
Output from v	vater hea	iter												
(64)m= 199.88	176.39	185.78	167.27	164.45	14	7.7 142.57	155	.45	154.86	173.41	182.45	195.31		_
								Outpu	ut from wa	iter heate	er (annual) <sub>1</sub>	12	2045.52	(64)
Heat gains fro	m water	heating	kWh/m	onth 0.2	5 ´[(	0.85 × (45)m	ı + (6	1)m]	) + 0.8 x	[(46)m	+ (57)m	+ (59)m	n ]	
(65)m= 92.3	81.99	87.61	80.63	80.52	74	.12 73.25	77.	53	76.5	83.5	85.67	90.78		(65)
include (57)	m in cal	culation	of (65)m	only if c	ylind	der is in the	dwell	ing c	or hot wa	ater is f	rom com	munity h	neating	
5. Internal g	ains (se	e Table 5	and 5a	):										
Metabolic gai	ns (Table	e 5) Wat	ts											
Jan	Feb	Mar	Apr	May	J	un Jul	A	ug	Sep	Oct	Nov	Dec	]	
(66)m= 114.61	114.61	114.61	114.61	114.61	114	1.61 114.61	114	.61	114.61	114.61	114.61	114.61	1	(66)
Lighting gains	(calcula	ted in A	pendix	L, equat	ion l	 _9 or L9a), a	ılso s	ee T	able 5					
(67)m= 17.99	15.98	12.99	9.84	7.35	6.	<del></del>	8.7	_	11.7	14.86	17.34	18.49	1	(67)
Appliances ga	ains (calc	ulated ir	n Append	dix L. ea	uatio	on L13 or L1	3a). a	also	see Tab	ole 5	1	l	J	
(68)m= 201.78	<del>- `</del>	198.6	187.37	173.19	_	9.86 150.96	148	_	154.14	165.37	179.55	192.88	1	(68)
Cooking gains	s (calcula	ated in A	npendix	L. eguat	ion	L L15 or L15a	L—— ), als	o se	e Table	5		<u> </u>	J	
(69)m= 34.46	34.46	34.46	34.46	34.46	_	.46 34.46	34.4		34.46	34.46	34.46	34.46	1	(69)
Pumps and fa	ns gains		 5a)		<u> </u>		<u> </u>						J	
(70)m= 0	0	0	0	0		0 0	0	П	0	0	0	0	]	(70)
Losses e.g. e	vanoratio	n (nega	tive valu	L es) (Tah	le 5	 \						<u> </u>	1	
(71)m= -91.69	-91.69	-91.69	-91.69	-91.69		.69 -91.69	-91.	69	-91.69	-91.69	-91.69	-91.69	]	(71)
Water heating	l n gains (T	I Table 5)	<u> </u>	<u> </u>	<u> </u>				ļ		1	<u> </u>	1	
(72)m= 124.06	<del>` ` `</del>	· —	111.98	108.23	102	2.94 98.45	104	.21	106.25	112.23	118.99	122.02	]	(72)
Total interna						(66)m + (67)n						<u>.                                    </u>	J	, ,
(73)m= 401.21	<del>,                                    </del>	386.74	366.57	346.15	326	3.39 313.5	319	<del>′</del>	329.48	349.85	<del>,</del> , , ,	390.77	1	(73)
6. Solar gain		1 300	000.01	0.01.0			1 0.0		020110	0.0.00	0.0.2.	300		( )
Solar gains are		using sola	r flux from	Table 6a	and a	ssociated equa	ations	to cor	overt to the	e applica	ble orientat	ion.		
Orientation:		_	Area			Flux			g_		FF		Gains	
	Table 6d	l	m²			Table 6a			able 6b	٦	able 6c		(W)	
North 0.9x	0.77	х	21.	28	х	10.63	х		0.63	x	0.7	=	69.15	(74)
North 0.9x	0.77	×	21.		x [	20.32	X		0.63	<b>-</b>   x	0.7		132.16	(74)
North 0.9x	0.77		21.		x	34.53	] ] <sub>X</sub>		0.63	   x	0.7	╡ -	224.57	(74)
North 0.9x	0.77		21.		x	55.46	)   x		0.63	x	0.7	╡ -	360.71	(74)
North 0.9x	0.77		21.		~ L	74.72	] ^ ] <sub>x</sub>		0.63	^ L _ x [	0.7	= =	485.91	(74)
North 0.9x	0.77		21.		x [	79.99	]		0.63	^ L	0.7	= =	520.18	(74)
North 0.9x	0.77		21.		^ L x Г	74.68	] ^ ] x		0.63	^ L x [	0.7		485.65	(74)
North 0.9x		<b></b>   ^			  -		J ^		0.00	╡╶╞		=		=
	0.77	X	21.	വ	X	59.25	X		0.63	X	0.7	=	385.31	(74)

North	0.9x	0.77	x	21.	28	x	4	1.52	X	0.63	X	0.7	=	270	(74)
North	0.9x	0.77	X	21.	28	X	2	4.19	X	0.63	x	0.7	=	157.31	(74)
North	0.9x	0.77	X	21.	28	X	1	3.12	X	0.63	x	0.7	=	85.31	(74)
North	0.9x	0.77	X	21.	28	X	8	3.86	X	0.63	x	0.7	=	57.65	(74)
West	0.9x	0.77	х	4.5	52	X	1	9.64	X	0.63	x	0.7	=	27.13	(80)
West	0.9x	0.77	X	4.5	52	X	3	8.42	X	0.63	x	0.7	=	53.07	(80)
West	0.9x	0.77	Х	4.5	52	X	6	3.27	X	0.63	x	0.7	=	87.4	(80)
West	0.9x	0.77	X	4.5	52	X	9	2.28	X	0.63	x	0.7	=	127.47	(80)
West	0.9x	0.77	X	4.5	52	X	1	13.09	X	0.63	x	0.7	=	156.22	(80)
West	0.9x	0.77	X	4.5	52	X	1	15.77	x	0.63	x	0.7	=	159.92	(80)
West	0.9x	0.77	X	4.5	52	X	1	10.22	X	0.63	x	0.7	=	152.25	(80)
West	0.9x	0.77	X	4.5	52	X	9	4.68	X	0.63	x	0.7	=	130.78	(80)
West	0.9x	0.77	X	4.5	52	X	7	3.59	X	0.63	x	0.7	=	101.65	(80)
West	0.9x	0.77	х	4.5	52	X	4	5.59	X	0.63	x	0.7	=	62.98	(80)
West	0.9x	0.77	Х	4.5	52	X	2	4.49	X	0.63	x	0.7	=	33.83	(80)
West	0.9x	0.77	x	4.5	52	X	1	6.15	X	0.63	x	0.7	=	22.31	(80)
Solar o	ains in	watts. ca	alculated	for eac	h month	h			(83)m	n = Sum(74)m .	(82)m				
(83)m=	96.28	185.23	311.97	488.18	642.13	$\neg$	80.1	637.91	516	<del></del>	220.2	1	79.96	]	(83)
Total g	ains – i	nternal a	ınd solar	(84)m =	- (73)m	+ (	83)m	, watts			<u> </u>			1	
(84)m=	497.5	584.48	698.71	854.75	988.28	1	006.5	951.41	835	.26 701.13	570.1	4 492.41	470.73	]	(84)
7 Ma	an intar	rnal tomr				•			_						
				(hooting	COOCO	n)									
				(heating			area f	from Tak	olo 0	Th1 (°C)				24	7(85)
Temp	erature	during h	eating p	eriods ir	n the liv	ing			ole 9	, Th1 (°C)				21	(85)
Temp	erature ation fac	during h	eating p	eriods ir iving are	n the liv ea, h1,n	ring n (s	ее Та	ble 9a)			000	h Nov	Dec	21	(85)
Temp Utilisa	erature ation fac Jan	during heter for g	neating p ains for l Mar	eriods ir iving are Apr	n the liv ea, h1,n May	ring n (s	ee Ta Jun	ble 9a) Jul	Α	ug Sep	Oc		Dec	21	
Temp	erature ation fac	during h	eating p	eriods ir iving are	n the liv ea, h1,n	ring n (s	ее Та	ble 9a)		ug Sep	Oc 0.85		Dec 0.96	21	(85)
Temp Utilisa (86)m=	erature ation fac Jan 0.95	during heter for grant Feb 0.93	neating p ains for I Mar	eriods ir iving are Apr 0.77	n the livea, h1,n May	ring n (s	ee Ta Jun <sup>0.46</sup>	ble 9a) Jul 0.35	A 0.	ug Sep	-			21	
Temp Utilisa (86)m=	erature ation fac Jan 0.95	during heter for grant Feb 0.93	neating p ains for I Mar	eriods ir iving are Apr 0.77	n the livea, h1,n May	n (s	ee Ta Jun <sup>0.46</sup>	ble 9a) Jul 0.35	A 0.	ug Sep 4 0.63	-	0.93		21	
Temp Utilisa (86)m= Mean (87)m=	erature ation fac Jan 0.95 interna 18.73	during heter for games feb 0.93 I temper 19.04	neating p ains for I Mar 0.88 ature in	eriods ir iving are Apr 0.77 living are 20.21	n the livea, h1,n May 0.62 ea T1 (f	ing n (s follo	Jun 0.46 ow ste	Jul 0.35 ps 3 to 7 20.96	A 0.7 in T 20.	ug Sep 4 0.63	0.85	0.93	0.96	21	(86)
Temp Utilisa (86)m= Mean (87)m=	erature ation fac Jan 0.95 interna 18.73	during heter for games feb 0.93 I temper 19.04	neating p ains for I Mar 0.88 ature in	eriods ir iving are Apr 0.77 living are 20.21	n the livea, h1,n May 0.62 ea T1 (f	f dw	Jun 0.46 ow ste	Jul 0.35 ps 3 to 7 20.96	A 0.7 in T 20.	ug Sep 4 0.63 Table 9c) 95 20.74 9, Th2 (°C)	0.85	0.93	0.96	21	(86)
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Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Litilization feator for going law.							
Utilisation factor for gains, hm:  (94)m=	0.37	0.59	0.81	0.91	0.94		(94)
Useful gains, hmGm , W = (94)m x (84)m	0.01	0.00	0.01	0.01	0.01		(- )
	308.93	415.75	460.75	445.92	442.04		(95)
Monthly average external temperature from Table 8	<u>.</u>						
(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 mean internal temperature, Lm , W =[(39)m x	<del>-`` /</del> -	<u> </u>	_		1	ı	(07)
	324.68	494.47	726.37	943	1128.48		(97)
Space heating requirement for each month, kWh/month = 0.024 (98)m= 506.61 397.46 327.75 177.47 80.14 0 0	$\frac{ \mathbf{x} (97)}{0}$	m – (95 0	)MJ X (4 <sup>7</sup> 197.62	357.9	510.71		
(65)			(kWh/year			2555.67	(98)
Space heating requirement in kWh/m²/year		, , , ,	(	,(-	-710,012	35.52	(99)
9b. Energy requirements – Community heating scheme						00.02	
This part is used for space heating, space cooling or water heating	na provi	ded by :	a comm	unity sch	neme		
Fraction of space heat from secondary/supplementary heating (T				army oor		0	(301)
Fraction of space heat from community system $1 - (301) =$						1	(302)
The community scheme may obtain heat from several sources. The procedure all			up to four o	other heat	sources; ti	he latter	
includes boilers, heat pumps, geothermal and waste heat from power stations. Se Fraction of heat from Community boilers	ee Appen	dix C.			1	0.4	(303a)
Fraction of community heat from heat source 2						0.4	(303b)
Fraction of total space heat from Community boilers			(3)	02) x (303	:a) =		(304a)
Fraction of total space heat from community heat source 2			•	02) x (303	,	0.4	(304b)
	:	tin a	•	02) X (303	io) = 	0.4	╡`
Factor for control and charging method (Table 4c(3)) for commun	•	ung sys	tem			1	(305)
Distribution loss factor (Table 12c) for community heating system	1					1.05	(306)
Space heating Annual space heating requirement					I	kWh/yea 2555.67	, 
Space heat from Community boilers		(98) x (3(	04a) x (305	5) x (306) :	_	1073.38	(307a)
			04b) x (305				(307b)
Space heat from heat source 2					<del>-</del> !	1073.38	=======================================
Efficiency of secondary/supplementary heating system in % (from				,		0	(308
Space heating requirement from secondary/supplementary system	m	(98) x (30	01) x 100 ÷	- (308) =		0	(309)
Water heating					Ī	00.45.50	7
Annual water heating requirement  If DHW from community scheme:						2045.52	
Water heat from Community boilers		(64) x (30	03a) x (305	5) x (306) :	=	859.12	(310a)
Water heat from heat source 2		(64) x (30	03b) x (305	5) x (306)	=	859.12	(310b)
Electricity used for heat distribution	0.01	× [(307a).	(307e) +	(310a)(	(310e)] =	38.65	(313)
Cooling System Energy Efficiency Ratio						0	(314)
Space cooling (if there is a fixed cooling system, if not enter 0)		= (107) ÷	(314) =			0	(315)
Electricity for pumps and fans within dwelling (Table 4f):							<u> </u>
mechanical ventilation - balanced, extract or positive input from o	outside					262.64	(330a)

_		_
warm air heating system fans	0	(330b)
pump for solar water heating	0	(330g)
Total electricity for the above, kWh/year =(330a) + (330b) + (330g) =	262.64	(331)
Energy for lighting (calculated in Appendix L)	317.69	(332)
Electricity generated by PVs (Appendix M) (negative quantity)	-701.99	(333)
Electricity generated by wind turbine (Appendix M) (negative quantity)	0	(334)
12b. CO2 Emissions – Community heating scheme		
Energy Emission factor I kWh/year kg CO2/kWh I	Emissions kg CO2/year	
•	ng COZIYeai	
CO2 from other sources of space and water heating (not CHP)  Efficiency of heat source 1 (%)  If there is CHP using two fuels repeat (363) to (366) for the second fuel	89	(367a)
Efficiency of heat source 2 (%)  If there is CHP using two fuels repeat (363) to (366) for the second fuel	89	(367b)
CO2 associated with heat source 1 [(307b)+(310b)] x 100 ÷ (367b) x 0.22 =	469.01	(367)
CO2 associated with heat source 2 [(307b)+(310b)] x 100 ÷ (367b) x 0.22 =	469.01	(368)
Electrical energy for heat distribution [(313) x 0.52 =	20.06	(372)
Total CO2 associated with community systems (363)(366) + (368)(372) =	958.08	(373)
CO2 associated with space heating (secondary) (309) x 0 =	0	(374)
CO2 associated with water from immersion heater or instantaneous heater (312) x 0.22 =	0	(375)
Total CO2 associated with space and water heating (373) + (374) + (375) =	958.08	(376)
CO2 associated with electricity for pumps and fans within dwelling (331)) x 0.52 =	136.31	(378)
CO2 associated with electricity for lighting (332))) x 0.52 =	164.88	(379)
Energy saving/generation technologies (333) to (334) as applicable   Item 1   0.52   × 0.01 = [	-364.33	(380)
Total CO2, kg/year sum of (376)(382) =	894.94	(383)
Dwelling CO2 Emission Rate (383) ÷ (4) =	12.44	(384)

El rating (section 14)

(385)

89.75

User Details: John Ashe **Assessor Name:** Stroma Number: STRO031268 Stroma FSAP 2012 **Software Version: Software Name:** Version: 1.0.5.8 Property Address: Unit 10 - COPPETTS WOOD, London Address: 1. Overall dwelling dimensions Area(m²) Av. Height(m) Volume(m³) Ground floor (1a) x (2a) = 191.36 (3a) 71.94 2.66 Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+....(1n)(4)71.94 Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+....(3n) =191.36 (5) total main secondary other m³ per hour heating heating x 40 =Number of chimneys (6a) 0 0 x 20 =Number of open flues 0 O O 0 0 (6b) Number of intermittent fans x 10 =(7a) 3 30 x 10 =Number of passive vents (7b) 0 0 x 40 =Number of flueless gas fires (7c)Air changes per hour Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = $\div$  (5) = (8) 0.16 If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) (9) O Additional infiltration (10)[(9)-1]x0.1 =0 Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction (11)0 if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0 0 (12) If no draught lobby, enter 0.05, else enter 0 (13)O Percentage of windows and doors draught stripped (14)0 Window infiltration  $0.25 - [0.2 \times (14) \div 100] =$ 0 (15)Infiltration rate (8) + (10) + (11) + (12) + (13) + (15) =O (16)Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area (17)5 If based on air permeability value, then  $(18) = [(17) \div 20] + (8)$ , otherwise (18) = (16)0.41 (18)Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered (19)0  $(20) = 1 - [0.075 \times (19)] =$ Shelter factor (20)1  $(21) = (18) \times (20) =$ Infiltration rate incorporating shelter factor 0.41 (21)Infiltration rate modified for monthly wind speed Jan Feb Jul Sep Mar Apr Mav Jun Aug Oct Nov Dec Monthly average wind speed from Table 7 (22)m =5.1 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7 Wind Factor  $(22a)m = (22)m \div 4$ (22a)m 1.27 1.25 1.23 1.08 0.95 0.95 0.92 1 1.08 1.12 1.1 1.18

Adjusted infiltra	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
0.52	0.51	0.5	0.45	0.44	0.39	0.39	0.38	0.41	0.44	0.46	0.48		
Calculate effect		-	rate for t	he appli	cable ca	se	!					•	
If mechanica			andiv N (2	3h) - (23s	) × Fmv (e	Aguation (1	NSN othe	rwisa (23h	n) – (23a)			0	(23a)
If balanced with		0 11		, ,	,	. ,	,, .	,	i) = (23a)			0	(23b)
		•	•	· ·		,		,	Ob\ma . (	00h) [	4 (00-)	. 4001	(23c)
a) If balance	o mech	anicai ve	nulation	with nea	o lat recove		7R) (248	$\int_{0}^{\infty} \int_{0}^{\infty} dx dx$	2b)m + (	23b) × [	1 – (23C) 1 0	÷ 100] 	(24a)
b) If balance											0		(= 1.5)
(24b)m= 0	0	o 0	0	0	0	0	0	0	0	0	0	1	(24b)
c) If whole h						<u> </u>						l	( )
if (22b)m				•	•				.5 × (23b	o)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24c)
d) If natural	ventilatio	on or wh	ole hous	e positiv	re input	ventilatio	on from I	oft	!	<u> </u>	ļ		
if (22b)m	0 = 1, the	en (24d)	m = (22l	o)m othe	rwise (2	4d)m =	0.5 + [(2	2b)m² x	0.5]			-	
(24d)m= 0.63	0.63	0.62	0.6	0.6	0.57	0.57	0.57	0.58	0.6	0.6	0.61		(24d)
Effective air	change	rate - er	iter (24a	) or (24b	o) or (24	c) or (24	d) in box	(25)					
(25)m= 0.63	0.63	0.62	0.6	0.6	0.57	0.57	0.57	0.58	0.6	0.6	0.61		(25)
3. Heat losses	s and he	eat loss p	paramete	er:									
ELEMENT	Gros	·	Openin		Net Ar	ea	U-val	ue	AXU		k-value	)	ΑΧk
	area	(m²)	m	Ž	A ,r	n²	W/m2	ιK	(W/I	K)	kJ/m²·l	<	kJ/K
Windows Type	e 1				14.83	x1.	/[1/( 1.4 )+	0.04] =	19.66				(27)
Windows Type	2				3.15	х1.	/[1/( 1.4 )+	0.04] =	4.18				(27)
Floor					71.94	1 x	0.13	=	9.3522				(28)
Walls	57.6	64	17.98	3	39.66	x	0.18	=	7.14				(29)
Total area of e	lements	, m²			129.5	8							(31)
* for windows and						ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	3.2	
** include the area Fabric heat los				is and pari	titions		(26)(30)	1 + (32) =				40.0	(22)
Heat capacity	•	`	U)				(20)(00)		(30) + (32	2) + (222)	(320) -	40.3	
Thermal mass		,	) _ Cm ·	TEA) ir	k I/m2k			(( )	itive Value	, , ,	(326) =	1029	
For design assess	•	`		,			ecisely the				able 1f	250	(35)
can be used instea				conditaon	011 410 1101	i iuioiiii pi	colooly the	maroanve	, raidoo oi		<i>abio 11</i>		
Thermal bridge	es : S (L	x Y) cal	culated ı	using Ap	pendix ł	<						6.48	(36)
if details of therma		are not kn	own (36) =	= 0.05 x (3	1)								
Total fabric hea									(36) =			46.8	1 (37)
Ventilation hea	1	1				<del></del>	· .		= 0.33 × (			I	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(20)
(38)m= 40.07	39.74	39.41	37.9	37.61	36.29	36.29	36.04	36.8	37.61	38.19	38.79		(38)
Heat transfer of						·		(39)m	= (37) + (		1	ı	
(39)m= 86.87	86.54	86.22	84.7	84.42	83.1	83.1	82.85	83.61	84.42	84.99	85.59		(22)
Heat loss para	meter (F	HP) W/	m²K						Average = = (39)m ÷		12 /12=	84.7	(39)
(40)m= 1.21	1.2	1.2	1.18	1.17	1.16	1.16	1.15	1.16	1.17	1.18	1.19		
, ,									L Average =		<u> </u>	1.18	(40)
									_	. ,		•	

Number of days in month (Table 1a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	iter heat	ing ener	rgy requi	rement:								kWh/ye	ear:	
\ eeum	ied occu	inancy I	NI									00	1	(42)
if TF		9, N = 1		[1 - exp	(-0.0003	849 x (TF	FA -13.9	)2)] + 0.0	0013 x (	ΓFA -13.		29		(42)
Annua	l averag	e hot wa	ater usaç									.64		(43)
		-	hot water person per			_	-	to achieve	a water us	se target o	f		•	
not more		Feb				i .		Δυα	Con	Oct	Nov	Doo	]	
Hot wate	Jan er usage in		Mar day for ea	Apr ach month	May Vd,m = fa	Jun ctor from 7	Jul Table 1c x	Aug (43)	Sep	Oct	Nov	Dec		
(44)m=	97.51	93.96	90.41	86.87	83.32	79.78	79.78	83.32	86.87	90.41	93.96	97.51		
( ,	01.101	00.00	•••••	00.0.	00.02		1	00.02			m(44) <sub>112</sub> =		1063.7	(44)
Energy o	content of	hot water	used - cal	culated mo	onthly $= 4$ .	190 x Vd,r	n x nm x C	OTm / 3600	) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		_
(45)m=	144.6	126.47	130.5	113.78	109.17	94.21	87.3	100.17	101.37	118.14	128.95	140.04		
				. ,						Total = Su	m(45) <sub>112</sub> =	-	1394.68	(45)
It instant			ng at point	,	hot water	r storage),	enter 0 in	boxes (46)	) to (61)				Ī	
(46)m= Water	21.69 storage	18.97	19.58	17.07	16.38	14.13	13.09	15.03	15.21	17.72	19.34	21.01		(46)
	_		includin	na anv sa	olar or W	/WHRS	storage	within sa	ame ves	sel		150		(47)
_		` ,	nd no ta	•			•					100		(,
	-	_			_			. ,	ers) ente	er '0' in (	47)			
Water	storage	loss:											_	
a) If m	anufact	urer's de	eclared l	oss facto	or is kno	wn (kWh	n/day):				1.	39		(48)
Tempe	erature fa	actor fro	m Table	2b							0.	54		(49)
0,			storage					(48) x (49)	) =		0.	75		(50)
•			eclared of factor fr	-								0		(51)
		•	ee secti		- (	,,,,,,	-77					0		(0.)
Volum	e factor	from Ta	ble 2a									0		(52)
Tempe	erature fa	actor fro	m Table	2b								0		(53)
•			storage	, kWh/ye	ear			(47) x (51)	) x (52) x (	53) =		0		(54)
	(50) or (	, ,	,								0.	75		(55)
Water		loss cal	culated f	or each	month	•		((56)m = (	55) × (41)ı	m			1	
(56)m=	23.33	21.07	23.33	22.58	23.33	22.58	23.33	23.33	22.58	23.33	22.58	23.33		(56)
If cylinde		dedicate	d solar sto	rage, (57)r	m = (56)m	x [(50) – (	H11)] ÷ (5	0), else (5	7)m = (56)	m where (	H11) is fro	m Append	lix H	
(57)m=	23.33	21.07	23.33	22.58	23.33	22.58	23.33	23.33	22.58	23.33	22.58	23.33		(57)
Primar	y circuit	loss (an	nual) fro	m Table	3							0		(58)
	-		culated t		,	•	. ,	, ,		_				
,						·		<del></del>	cylinde		<del></del>		1	(50)
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
	loss cal	culated	for each	month (	61)m =	(60) ÷ 36	65 × (41)	)m					1	
(61)m=	0	0	0	0	0	0	0	0	0	0	0	0		(61)

Total heat required for w	vater hea	ating ca	lculated	for e	ach month	(62)	m =	0.85 × (4	45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 191.19 168.55		158.87	155.76	139		146		146.46	164.73	174.05	186.63		(62)
Solar DHW input calculated us	sing Appe	ndix G or	Appendix	H (ne	gative quantity	/) (ent	er '0'	if no solar	contribu	tion to wate	er heating)		
(add additional lines if F	GHRS a	and/or V	vwhrs	appl	ies, see Ap	pend	lix G	i)					
(63)m= 0 0	0	0	0	0	0	0		0	0	0	0		(63)
Output from water heate	er	•			•			•		•		•	
(64)m= 191.19 168.55	177.1	158.87	155.76	139	3 133.89	146	.77	146.46	164.73	174.05	186.63		
					•		Outpu	ut from wa	ter heate	er (annual) <sub>1</sub>	12	1943.3	(64)
Heat gains from water h	eating, k	kWh/mc	onth 0.2	5 ′ [0.	85 × (45)m	+ (6	(1)m	] + 0.8 x	[(46)m	+ (57)m	+ (59)m	]	
(65)m= 85.35 75.72	80.67	73.9	73.57	67.	4 66.3	70.	58	69.78	76.56	78.95	83.84		(65)
include (57)m in calcu	ulation of	f (65)m	only if c	ylinde	er is in the o	dwell	ing c	or hot wa	ater is f	rom com	munity h	i leating	
5. Internal gains (see	Table 5	and 5a)	:								•		
Metabolic gains (Table s		·											
Jan Feb	Mar	Apr	May	Ju	n Jul	A	ug	Sep	Oct	Nov	Dec		
(66)m= 114.61 114.61	114.61	114.61	114.61	114.	61 114.61	114	.61	114.61	114.61	114.61	114.61		(66)
Lighting gains (calculate	ed in Apr	oendix L	eguati	on L	— <b>.</b> 9 or L9a), a	lso s	ee T	able 5					
(67)m= 17.99 15.98	12.99	9.84	7.35	6.2	<del></del>	8.7	_	11.7	14.86	17.34	18.49		(67)
Appliances gains (calcu	lated in	Append	lix L. ea	uatio	 n L13 or L1	 За). :	—т also	see Tab	le 5	1			
(68)m= 201.78 203.88		187.37	173.19	159.		148		154.14	165.37	179.55	192.88		(68)
Cooking gains (calculate	ed in An	nendix l	equat	ion I	 15 or l 15a'	L \ als	 0. Se	e Tahle	5				
(69)m= 34.46 34.46	34.46	34.46	34.46	34.4	<del> </del>	34.4	— т	34.46	34.46	34.46	34.46		(69)
Pumps and fans gains (					- 1								` '
(70)m= 3 3	3	3	3	3	3	3		3	3	3	3		(70)
Losses e.g. evaporation	l nenativ					<u> </u>							
	<del>``</del>	-91.69	-91.69	-91.6	69 -91.69	-91.	.69	-91.69	-91.69	-91.69	-91.69		(71)
Water heating gains (Ta	!												
(72)m= 114.72 112.68		102.64	98.89	93.6	1 89.12	94.	87 T	96.91	102.9	109.65	112.69		(72)
Total internal gains =					(66)m + (67)m					ļ.			` '
(73)m= 394.88 392.91	380.4	360.23	339.82	320.	· / · /	312	<del>'</del>	323.14	343.51	366.93	384.44		(73)
6. Solar gains:				0_0									
Solar gains are calculated us	sing solar t	flux from	Table 6a a	and as	sociated equa	itions	to cor	nvert to the	e applica	ble orientat	ion.		
Orientation: Access Fa	actor	Area			Flux			g_		FF		Gains	
Table 6d		m²			Table 6a			able 6b	Т	able 6c		(W)	
North 0.9x 0.77	x	14.8	33	х	10.63	x		0.63	<b>x</b>	0.7	=	48.19	(74)
North 0.9x 0.77	x	14.8	33	x	20.32	X		0.63	_ x [	0.7	=	92.1	(74)
North 0.9x 0.77	x	14.8	33	x	34.53	x		0.63	x	0.7	=	156.5	(74)
North 0.9x 0.77	x	14.8	33	x 🗏	55.46	x		0.63	x	0.7	=	251.38	(74)
North 0.9x 0.77	x	14.8	33	x	74.72	x		0.63	] x [	0.7	=	338.63	(74)
North 0.9x 0.77	×	14.8	33	x $\overline{}$	79.99	x		0.63	x	0.7		362.51	(74)
North 0.9x 0.77	x	14.8	33	x $\square$	74.68	X		0.63	x	0.7	<del>-</del>	338.45	(74)
North 0.9x 0.77	x	14.8	33	x 🗀	59.25	x		0.63	] x [	0.7	=	268.52	(74)

North	0.9x	0.77	X	14	.83	x	41.52	X	0.63	x	0.7	=	188.16	(74)
North	0.9x	0.77	х	14	.83	x	24.19	x	0.63	x	0.7		109.63	(74)
North	0.9x	0.77	X	14	.83	X	13.12	X	0.63	x	0.7	=	59.45	(74)
North	0.9x	0.77	X	14.	.83	X	8.86	X	0.63	x	0.7	=	40.18	(74)
West	0.9x	0.77	X	3.	15	X	19.64	X	0.63	x	0.7	=	18.91	(80)
West	0.9x	0.77	X	3.	15	X	38.42	X	0.63	x	0.7	=	36.99	(80)
West	0.9x	0.77	X	3.	15	X	63.27	X	0.63	x	0.7	=	60.91	(80)
West	0.9x	0.77	X	3.	15	X	92.28	X	0.63	x	0.7	=	88.84	(80)
West	0.9x	0.77	X	3.	15	X	113.09	X	0.63	x	0.7	=	108.87	(80)
West	0.9x	0.77	X	3.	15	X	115.77	X	0.63	x	0.7	=	111.45	(80)
West	0.9x	0.77	X	3.	15	X	110.22	X	0.63	x	0.7	=	106.11	(80)
West	0.9x	0.77	X	3.	15	X	94.68	X	0.63	x	0.7	=	91.14	(80)
West	0.9x	0.77	X	3.	15	X	73.59	X	0.63	x	0.7	=	70.84	(80)
West	0.9x	0.77	X	3.	15	X	45.59	X	0.63	x	0.7	=	43.89	(80)
West	0.9x	0.77	X	3.	15	X	24.49	X	0.63	x	0.7	=	23.58	(80)
West	0.9x	0.77	X	3.	15	X	16.15	X	0.63	x	0.7	=	15.55	(80)
Solar g	ains in	watts, ca	alculated	l for eac	h month	า		(83)n	n = Sum(74)m	(82)m				
(83)m=	67.1	129.09	217.41	340.21	447.5	$\overline{}$	73.96 444.	56 359	.66 259.01	153.5	2 83.03	55.72	]	(83)
Total g	ains – ii	nternal a	nd solar	(84)m :	= (73)m	+ (8	33)m , watt	s					4	
(84)m=	461.98	522	597.81	700.45	787.32	7	94.02 751.7	72 67	2.5 582.15	497.0	3 449.96	440.16	1	(84)
7 Mo	on into	1.4									•	•	-	
	SIAMIAIKSIA	nai temn	erature	(heating	r seasoi	n)								
		•		•	g seasoi n the liv		area from <sup>-</sup>	Tahle 9	Th1 (°C)				21	(85)
Temp	erature	during h	eating p	eriods i	n the liv	ing	area from <sup>-</sup>		, Th1 (°C)				21	(85)
Temp	erature ition fac	during h	eating pains for	eriods i	n the liv	ing n (s	ee Table 9	a)		Oct	Nov	Dec	21	(85)
Temp Utilisa	erature ition fac Jan	during h tor for ga	eating p ains for Mar	eriods i iving ar Apr	n the liv ea, h1,n May	ing n (s	ee Table 9	a) I A	ug Sep	Oct		Dec	21	
Temp Utilisa (86)m=	erature ition fac Jan 1	during h tor for ga Feb 0.99	eating pains for Mar	eriods i iving ar Apr 0.95	n the livea, h1,n May 0.83	ing n (s	ee Table 9a Jun Ju 0.64 0.48	a) I A 8 0.8	ug Sep 55 0.83	Oct	Nov 0.99	Dec 1	21	(85)
Temp Utilisa (86)m=	erature Ition fac Jan 1 interna	during h tor for ga Feb 0.99	eating pains for Mar 0.99	eriods in living are Apr 0.95 living ar	n the livea, h1,n May 0.83	ing n (s	ee Table 9 Jun Ju 0.64 0.48 w steps 3 t	a) I A 8 0.4	ug Sep 55 0.83 able 9c)	0.97	0.99	1	21	(86)
Temp Utilisa (86)m=	erature ition fac Jan 1	during h tor for ga Feb 0.99	eating pains for Mar	eriods i iving ar Apr 0.95	n the livea, h1,n May 0.83	ing n (s	ee Table 9a Jun Ju 0.64 0.48	a) I A 8 0.4	ug Sep 55 0.83 able 9c)	<b>-</b>	0.99		21	
Temp Utilisa (86)m= Mean (87)m=	erature Ition fac Jan 1 interna	during h tor for ga Feb 0.99 I tempera	eating pains for Mar 0.99 ature in 20.14	eriods in iving are 0.95 living ar 20.53	n the livea, h1,n May 0.83 ea T1 (1 20.83	ing n (s follo	ee Table 9 Jun Ju 0.64 0.48 w steps 3 t	a)  I A  B 0.8  to 7 in 7	ug Sep 55 0.83 Table 9c) 99 20.88	0.97	0.99	1	21	(86)
Temp Utilisa (86)m= Mean (87)m=	erature Ition fac Jan 1 interna	during h tor for ga Feb 0.99 I tempera	eating pains for Mar 0.99 ature in 20.14	eriods in iving are 0.95 living ar 20.53	n the livea, h1,n May 0.83 ea T1 (1 20.83	ing n (s follo	ee Table 9  Jun Ju  0.64 0.48  w steps 3 t  0.97 20.9	a) I A B 0.9 to 7 in 7 p9 20. Table 9	ug Sep 55 0.83 Table 9c) 99 20.88 9, Th2 (°C)	0.97	0.99	1	21	(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m=	erature Ition fac Jan 1 interna 19.72 erature 19.91	during heter for garage feb 0.99 l temper 19.87 during heter 19.92	meating properties of the control of	Apr 0.95 living ar 20.53 eriods i	n the livea, h1,n May 0.83 ea T1 (1 20.83 n rest of 19.94	n (s	y steps 3 to 10.97 20.9 20.9 20.9 19.96 19.9	a) I A B 0.9 to 7 in 7 99 20. Table 9 19.	ug Sep 55 0.83 Table 9c) 99 20.88 9, Th2 (°C)	20.49	0.99	19.71	21	(86)
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Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilisation factor for gains, hm:		
(94)m= 1 0.99 0.98 0.93 0.8 0.6 0.44 0.51 0.79 0.96 0.99 1		(94)
Useful gains, hmGm , W = (94)m x (84)m		
(95)m= 459.9 517.54 584.92 651.2 632.32 477.48 328.96 341.15 462.77 477.85 446.06 438.59		(95)
Monthly average external temperature from Table 8		
(96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 16.4 14.1 10.6 7.1 4.2		(96)
Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(93)m- (96)m]		
(97)m= 1289.84 1248.23 1133.45 948.31 736.9 496.28 332.08 347.36 533.94 797.96 1057.04 1278.17		(97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m		
(98)m= 617.47 491.02 408.1 213.92 77.81 0 0 0 0 238.16 439.9 624.65		1,000
Total per year (kWh/year) = Sum(98) <sub>15,912</sub> =	3111.04	(98)
Space heating requirement in kWh/m²/year	43.24	(99)
9a. Energy requirements – Individual heating systems including micro-CHP)		
Space heating:		_
Fraction of space heat from secondary/supplementary system	0	(201)
Fraction of space heat from main system(s) (202) = 1 - (201) =	1	(202)
Fraction of total heating from main system 1 (204) = (202) × [1 – (203)] =	1	(204)
Efficiency of main space heating system 1	93.5	(206)
Efficiency of secondary/supplementary heating system, %	0	(208)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	kWh/yea	r
Space heating requirement (calculated above)	,	
617.47 491.02 408.1 213.92 77.81 0 0 0 0 238.16 439.9 624.65		
(211)m = {[(98)m x (204)] } x 100 ÷ (206)		(211)
660.4 525.16 436.47 228.8 83.22 0 0 0 0 254.72 470.48 668.07		
Total (kWh/year) =Sum(211) <sub>15,1012</sub> =	3327.31	(211)
Space heating fuel (secondary), kWh/month		•
$= \{[(98)m \times (201)] \} \times 100 \div (208)$		
(215)m= 0 0 0 0 0 0 0 0 0 0 0		_
Total (kWh/year) =Sum(215) <sub>15,1012</sub> =	0	(215)
Water heating		
Output from water heater (calculated above)		
191.19     168.55     177.1     158.87     155.76     139.3     133.89     146.77     146.46     164.73     174.05     186.63		1,,,,,
Efficiency of water heater	79.8	(216)
(217)m=     87.72     87.5     86.97     85.61     83.07     79.8     79.8     79.8     79.8     85.8     87.19     87.79		(217)
Fuel for water heating, kWh/month (219)m = (64)m x 100 ÷ (217)m		
(219)m= 217.96 192.63 203.63 185.57 187.51 174.56 167.78 183.92 183.53 192 199.63 212.58		
Total = Sum(219a) <sub>112</sub> =	2301.3	(219)
Annual totals kWh/year	kWh/year	1 '
Space heating fuel used, main system 1	3327.31	
		4
Water heating fuel used	2301.3	]

central heating pump:		30	(230c)
boiler with a fan-assisted flue		45	(230e)
Total electricity for the above, kWh/year	sum of (230a	u)(230g) =	75 (231)
Electricity for lighting			317.69 (232)
12a. CO2 emissions – Individual heating systems	s including micro-CHP		
	<b>Energy</b> kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	718.7 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	497.08 (264)
Space and water heating	(261) + (262) + (263) + (264) =		1215.78 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	164.88 (268)
Total CO2, kg/year	sum	of (265)(271) =	1419.59 (272)

TER =

(273)

19.73

### **SAP 2012 Overheating Assessment**

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

#### Property Details: Unit 10 - COPPETTS WOOD, London

Dwelling type:FlatLocated in:EnglandRegion:Thames valley

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

Overshading: Average or unknown

Overhangs: None

Thermal mass parameter: Indicative Value Low

**Night ventilation:** False

Blinds, curtains, shutters:

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

Overheating Details:

Summer ventilation heat loss coefficient: 252.6 (P1)

Transmission heat loss coefficient: 56

Summer heat loss coefficient: 308.57 (P2)

Overhangs:

Orientation: Ratio: Z\_overhangs:

North (Rear Windows) 0 1 West (Left Windows) 0 1

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
North (Rear Windo	ows) 1	0.9	1	0.9	(P8)
West (Left Windov	vs) 1	0.9	1	0.9	(P8)

Solar gains

Orientation		Area	Flux	$g_{-}$	FF	Shading	Gains
North (Rear Windows)	0.9 x	21.28	81.19	0.63	0.7	0.9	617.12
West (Left Windows)	0.9 x	4.52	117.51	0.63	0.7	0.9	189.73
						Total	806 85 <b>(P3/P4)</b>

#### Internal dains:

	June	July	August
Internal gains	453.95	437.42	445.08
Total summer gains	1323	1244.27	1113.76 <b>(P5)</b>
Summer gain/loss ratio	4.29	4.03	3.61 <b>(P6)</b>
Mean summer external temperature (Thames valley)	16	17.9	17.8
Thermal mass temperature increment	1.3	1.3	1.3
Threshold temperature	21.59	23.23	22.71 <b>(P7)</b>
Likelihood of high internal temperature	Slight	Medium	Medium

Assessment of likelihood of high internal temperature: Medium