			User D	etails:						
Assessor Name: Software Name:	George Farr Stroma FSAP 2012	2	Software Version: Version						0028460 on: 1.0.4.10	
		Pi	roperty i	Address	: 99 Car	nden Me	WS			
Address:	-1									
1. Overall dwelling dimen	isions:		Aroc	n/m2\		Av. Hai	iaht/m\		Volumo/m³	1
Ground floor				8.14	(1a) x	Av. Hei	42	(2a) =	Volume(m³	(3a)
First floor					(1b) x](2b) =		(3b)
							.88]	187.62	╡``
Second floor			2	25.9	(1c) x	2.	.75	(2c) =	71.22	(3c)
Total floor area TFA = (1a))+(1b)+(1c)+(1d)+(1e)	+(1n) 1	49.3	(4)					
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)+	.(3n) =	399.84	(5)
2. Ventilation rate:										<u></u>
		condar eating	y	other		total			m³ per hou	r
Number of chimneys	0 +	0	+ [0] = [0	x 4	40 =	0	(6a)
Number of open flues	0 +	0	j + F	0	ī = F	0	x	20 =	0	(6b)
Number of intermittent fan	s				_ _ _	4	x	10 =	40	
Number of passive vents					_ 	0	x	10 =	0	(7b)
Number of flueless gas fire	2 6				F	0	x	40 =	0	(7c)
Trainiber of haciess gas inc	55				L				U	(/'C)
								Air ch	nanges per ho	our
Infiltration due to chimneys	s, flues and fans = (6a	ı)+(6b)+(7	a)+(7b)+(7c) =	Γ	40		÷ (5) =	0.1	(8)
If a pressurisation test has bee					continue fr	om (9) to (
Number of storeys in the	e dwelling (ns)								0	(9)
Additional infiltration	OF facilities and only on f		0.05 (-				[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.2 if both types of wall are pre					•	uction			0	(11)
deducting areas of opening	•	onaing to	ino grout	or wan are	a (anoi					
If suspended wooden flo	oor, enter 0.2 (unseale	ed) or 0.	1 (seale	d), else	enter 0				0	(12)
If no draught lobby, ente	er 0.05, else enter 0								0	(13)
Percentage of windows	and doors draught str	ipped							0	(14)
Window infiltration				0.25 - [0.2	x (14) ÷ 1	00] =			0	(15)
Infiltration rate				(8) + (10)	+ (11) + (1	12) + (13) +	+ (15) =		0	(16)
Air permeability value, q	50, expressed in cubi	c metre	s per ho	ur per s	quare m	etre of e	nvelope	area	3.5	(17)
If based on air permeability									0.28	(18)
Air permeability value applies	•	been don	e or a deg	gree air pe	rmeability	is being us	sed		_	_
Number of sides sheltered	I			(20) = 1 -	[0 075 v /	10)1 –			2	(19)
Shelter factor				. ,	·	. 0/] –			0.85	(20)
Infiltration rate incorporating				(21) = (18) x (2U) =				0.23	(21)
Infiltration rate modified for		<u>, 1</u>		_	_	_		1 _	1	
	Mar Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spe	ed from Table 7								_	

4.4

4.3

3.8

3.8

3.7

4.3

4.5

4.7

4.9

(22)m=

Wind Factor (2	22a)m =	(22)m ÷	4									
(22a)m= 1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18	
Adjusted infiltr	ation rat	e (allowi	na for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m				
0.3	0.29	0.29	0.26	0.25	0.22	0.22	0.22	0.23	0.25	0.26	0.27]
Calculate effec		•	rate for t	he appli	cable ca	se						·
If mechanica			andiv N (2	3h) - (23a	a) v Emy (aguation (N5N othe	nvice (23h	n) = (33a)			0 (2
If balanced with)) = (23a)			0 (2
a) If balance		•	•	_		,		,	2h\m + (23h) v [1 _ (23c)	0 (2 - ± 1001
(24a)m= 0	0	0	0	0	0	0	0	0	0	0	0] (2
b) If balance	ed mech	anical ve	L entilation	without	heat red	coverv (ľ	I ЛV) (24b)m = (2	 2b)m + (1 23b)		,
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0	(2
c) If whole h	ouse ex	tract ven	tilation o	r positiv	e input	ventilatio	on from o	outside	!	!	ļ	ı
,		< (23b), t			•				.5 × (23k	o)		_
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0	(2
d) If natural									0.51			
(24d)m = 0.54	n = 1, th	en (24d) _{0.54}	0.53	0.53	0.52	0.52	0.5 + [(2	0.53	0.5]	0.53	0.54] (2
Effective air			<u> </u>		<u> </u>		ļ	<u> </u>	1 0.00	1 0.00	0.04	1
(25)m= 0.54	0.54	0.54	0.53	0.53	0.52	0.52	0.52	0.53	0.53	0.53	0.54] (2
	l .	<u> </u>	l		l .							J
0 11 11		4.1										
3. Heat losse					Not Ar	200	Hayoli	110	A V I I		k volue	A Y k
3. Heat losse ELEMENT	s and he Gros area	SS	oaramet Openin m	gs	Net Ar A ,r		U-valı W/m2		A X U (W/		k-value kJ/m²-l	
	Gros	SS	Openin	gs		m²						
ELEMENT	Gros	SS	Openin	gs	A ,r	m² x	W/m2	2K	(W/			K kJ/K
ELEMENT Doors Type 1	Gros area	SS	Openin	gs	A ,r	m² x x	W/m2	2K = =	(W/ 2.808			K kJ/K
ELEMENT Doors Type 1 Doors Type 2	Gros area	SS	Openin	gs	A ,r 2.34 2.12	m ²	W/m2 1.2	2K = = = • 0.04] =	(W/ 2.808 2.544			K kJ/K (2 (2
Doors Type 1 Doors Type 2 Windows Type	Gros area	SS	Openin	gs	A ,r 2.34 2.12 24.18	m ²	W/m2 1.2 1.2 /[1/(1.2)+	= = = = = = = = = = = = = = = = = = =	(W/ 2.808 2.544 27.69			K kJ/K (2 (2
Doors Type 1 Doors Type 2 Windows Type Windows Type	Gros area	SS	Openin	gs	A ,r 2.34 2.12 24.18 26.58	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+	= \bigcolum_0.04]	(W/ 2.808 2.544 27.69 30.44	K)		K kJ/K (2 (2 (2 (2
Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type	Gros area	SS	Openin	gs	A ,r 2.34 2.12 24.18 26.58 2.94	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+	= \bigcolum_0.04]	(W/ 2.808 2.544 27.69 30.44 3.37	K)		K kJ/K (2 (2 (2 (2 (2
Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights	Gros area	ss (m²)	Openin	gs ²	A ,r 2.34 2.12 24.18 26.58 2.94 9.79	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+	eK = = = = = = = = = = = = = = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748	K)	kJ/m²-l	K kJ/K (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2
Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor	Gros area 1 2 2 3	.3	Openin m	gs ²	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+	eK = = = = = = = = = = = = = = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396	K)	kJ/m²-l	K kJ/K (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2
Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1	Gros area 1 2 2 3 3	.3 61	Openin m	gs ₁ 2	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18	EK = = = = = = = = = = = = = = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11	K)	kJ/m²-l	K kJ/K (2 (2 (2 (2 (2 (2 (2 (3 (3368.4 (2 (2 (2 (2 (2 (3368.4 (2 (2 (2 (2 (2 (3368.4 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1 Walls Type2	Gros area 9 1 9 2 9 3 114 72.6 65.1	.3 .3 .1 .12	58.10 0	gs ₁ 2	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14 72.6	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18 0.18	EK = = = = = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11 13.07	K)	110 60 14	K kJ/K (2 (2 (2 (2 (2 (2 (3 (3368.4 (2 (2 (2 (2 (3368.4 (2 (2 (3368.4 (2 (3)64.4 (2 (3)6
Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1 Walls Type2 Roof	Gros area 9 1 9 2 9 3 114 72.6 65.1	.3 .3 .1 .12	58.10 0	gs ₁ 2	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14 72.64 555.33	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18 0.18	EK = = = = = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11 13.07	K)	110 60 14	K kJ/K (2 (2 (2 (2 (2 (2 (3 (3368.4 (2 (3497.97 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3
Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1 Walls Type2 Roof Total area of e	Gros area 114 72.6 65.1	.3 .3 .1 .12	58.10 0	gs ₁₂	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14 72.67 55.33 310.1	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18 0.18 0.12	2K = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11 13.07 6.64	K)	110 60 14 9	K kJ/K (2 (2 (2 (2 (2 (2 (2 (3 (2 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1 Walls Type2 Roof Total area of elements	Gros area 114 72.6 65.1	.3 .3 .1 .12	58.10 0	gs ₁₂	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14 72.6 55.33 310.1 64.23	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18 0.18 0.12	2K = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11 13.07 6.64	K)	110 60 14 9	K kJ/K (2 (2 (2 (2 (2 (2 (2 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1 Walls Type2 Roof Total area of e Party wall Internal wall **	Gros area e 1 e 2 e 3 114 72.6 65.1	.3 .3 .1 .12	58.10 0	gs ₁₂	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14 72.6 55.33 310.1 64.23	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18 0.18 0.12	2K = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11 13.07 6.64	K)	110 60 14 9	K kJ/K (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Windows Type Rooflights Floor Walls Type1 Walls Type2 Roof Total area of e Party wall Internal wall ** Internal floor	Gros area 1 14 72.6 65.1 Elements	3 61 12 5, m ²	58.10 0 9.79	gs 2 6 1	A ,r 2.34 2.12 24.18 26.58 2.94 9.79 58.14 72.62 55.33 310.1 64.23 182.0 84.96 84.96 alue calculure	m ²	W/m2 1.2 1.2 /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ /[1/(1.2)+ 0.14 0.18 0.18 0.12	EK = = = = = =	(W/ 2.808 2.544 27.69 30.44 3.37 11.748 8.1396 10.11 13.07 6.64	K)	110 60 14 9 110 9	K kJ/K (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2

(26)...(30) + (32) =

Fabric heat loss, $W/K = S (A \times U)$

116

(33)

Heat capacity Cm = So	(Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	22276.07	(34)
Thermal mass parame	` ,	P = Cm -	- TFA) in	k.J/m²K			***	÷ (4) =	, , ,	,	149.2	(35)
For design assessments wh	•		,			eciselv the	` '		TMP in Ta	able 1f	149.2	(00)
can be used instead of a de						,						
Thermal bridges : S (L	x Y) cal	culated (using Ap	pendix l	<						31.45	(36)
if details of thermal bridging	are not kn	own (36) =	= 0.15 x (3	1)								_
Total fabric heat loss								(36) =			147.45	(37)
Ventilation heat loss ca	alculated	monthly	/				(38)m	= 0.33 × (25)m x (5)		ı	
Jan Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 71.83 71.61	71.38	70.34	70.14	69.23	69.23	69.06	69.58	70.14	70.54	70.95		(38)
Heat transfer coefficien	nt, W/K						(39)m	= (37) + (3	38)m			
(39)m= 219.29 219.06	218.84	217.79	217.59	216.68	216.68	216.51	217.03	217.59	217.99	218.4		_
Heat loss parameter (H	HLP), W/	′m²K						Average = = (39)m ÷	` '	12 /12=	217.79	(39)
(40)m= 1.47 1.47	1.47	1.46	1.46	1.45	1.45	1.45	1.45	1.46	1.46	1.46		
Number of days in mo	nth (Tab	le 1a)					,	Average =	Sum(40) ₁ .	12 /12=	1.46	(40)
Jan Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m= 31 28	31	30	31	30	31	31	30	31	30	31		(41)
` '												
4. Water heating ene	rav regui	irement [.]								kWh/ye	ear:	
rator noaming one	. 97 . 99											
Assumed occupancy,	N I											
		[1 ovn	(0 0003	140 v /TF	-A 12.0°	\2\1 · 0 (0012 v /	ΓΓΛ 1 2		93		(42)
if TFA > 13.9 , N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9))2)] + 0.0	0013 x (ΓFA -13.		93		(42)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot was	+ 1.76 x ater usaç	ge in litre	` es per da	y Vd,av	erage =	(25 x N)	+ 36		9)	93		(42)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average	+ 1.76 x ater usag hot water	ge in litre	es per da 5% if the d	ay Vd,av Iwelling is	erage = designed t	(25 x N)	+ 36		9)			, ,
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w	es per da 5% if the d rater use, f	ay Vd,av welling is not and co	erage = designed t ld)	(25 x N) to achieve	+ 36 a water us	se target o	9)	3.86		, ,
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w	es per da 5% if the d rater use, f	y Vd,av welling is not and co	erage = designed t ld) Jul	(25 x N) to achieve	+ 36		9)			, ,
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per	+ 1.76 x ater usag hot water person per Mar r day for ea	ge in litre usage by day (all w Apr ach month	es per da 5% if the d rater use, f May Vd,m = fac	y Vd,av welling is not and co Jun ctor from	erage = designed to designed to designed to designed to designed to design desi	(25 x N) to achieve Aug (43)	+ 36 a water us Sep	ose target o	9) 103 Nov	3.86 Dec		, ,
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w	es per da 5% if the d rater use, f	y Vd,av welling is not and co	erage = designed t ld) Jul	(25 x N) to achieve	+ 36 a water us Sep 101.78	Oct	9) 103 Nov 110.09	Dec 114.25	1246.22	(43)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per	+ 1.76 x ater usage hot water person per Mar r day for ear 105.94	ge in litre usage by a day (all w Apr ach month	es per da 5% if the d vater use, I May Vd,m = fac 97.63	ay Vd,av welling is not and co Jun ctor from 7	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63	+ 36 a water us Sep	Oct 105.94 Total = Sur	9) Nov 110.09 m(44) ₁₁₂ =	Dec 114.25	1246.33	, ,
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09	+ 1.76 x ater usage hot water person per Mar r day for ear 105.94	ge in litre usage by a day (all w Apr ach month	es per da 5% if the d vater use, I May Vd,m = fac 97.63	ay Vd,av lwelling is not and co Jun ctor from 7	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63	+ 36 a water us Sep	Oct 105.94 Total = Sur	9) Nov 110.09 m(44) ₁₁₂ =	Dec 114.25	1246.33	(43)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09	+ 1.76 x ater usage hot water person per Mar r day for ear 105.94 used - call	ge in litre usage by day (all w Apr ach month 101.78	es per da 5% if the d vater use, h May Vd,m = fac 97.63	ay Vd,av welling is not and co Jun ctor from 7 93.47	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63	+ 36 a water us Sep 101.78 0 kWh/mor 118.77	Oct 105.94 Total = Suith (see Ta	Nov 110.09 m(44) ₁₁₂ = 151.09	3.86 Dec 114.25 c, 1d) 164.08	1246.33	(43)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09	+ 1.76 x ater usag hot water person per Mar r day for ea 105.94 used - cale	ge in litre usage by day (all w Apr ach month 101.78 culated me 133.31	es per da 5% if the da 5% if the da 5% if the da 4	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63 97.763	+ 36 a water us Sep 101.78 0 kWh/mor 118.77	Oct 105.94 Total = Sunth (see Tail 138.42	Nov 110.09 m(44) ₁₁₂ = 151.09	3.86 Dec 114.25 c, 1d) 164.08		(43)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heatif (46)m= 25.41 22.23	+ 1.76 x ater usag hot water person per Mar r day for ea 105.94 used - cale	ge in litre usage by day (all w Apr ach month 101.78 culated me 133.31	es per da 5% if the da 5% if the da 5% if the da 4	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63 97.763	+ 36 a water us Sep 101.78 0 kWh/mor 118.77	Oct 105.94 Total = Sunth (see Tail 138.42	Nov 110.09 m(44) ₁₁₂ = 151.09	3.86 Dec 114.25 c, 1d) 164.08		(43)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heatif (46)m= 25.41 22.23 Water storage loss:	+ 1.76 x ater usage hot water person per Mar r day for each 105.94 used - calconding at point 22.94	ge in litre usage by day (all w Apr ach month 101.78 culated me 133.31	es per da 5% if the director use, I May Vd,m = fac 97.63	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63 07m / 3600 117.37 boxes (46) 17.61	+ 36 a water us Sep 101.78 118.77 118.77 10 (61) 17.82	Oct 105.94 Total = Sur 138.42 Total = Sur 20.76	Nov 110.09 m(44) ₁₁₂ = ables 1b, 1 151.09 m(45) ₁₁₂ =	3.86 Dec 114.25 c, 1d) 164.08		(43) (44) (45) (46)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heati (46)m= 25.41 22.23 Water storage loss: Storage volume (litres)	+ 1.76 x ater usag hot water person per Mar r day for ea 105.94 used - cale 152.91 ng at point 22.94	ge in litre usage by day (all w Apr ach month 101.78 culated me 133.31 of use (no	es per da 5% if the da 5% if th	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63 117.37 boxes (46) 17.61 within sa	+ 36 a water us Sep 101.78 118.77 118.77 10 (61) 17.82	Oct 105.94 Total = Sur 138.42 Total = Sur 20.76	Nov 110.09 m(44) ₁₁₂ = ables 1b, 1 151.09 m(45) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08		(43) (44) (45)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heatif (46)m= 25.41 22.23 Water storage loss: Storage volume (litres) If community heating a	the table and the table and the table and tabl	ge in litre usage by day (all w Apr ach month 101.78 culated me 133.31 for use (no	es per da 5% if the de 5% if the 5% if the de 5% if the de 5% if the de 5% if the de 5% if the d	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38 storage), 16.56	erage = designed to do	(25 x N) to achieve Aug (43) 97.63 117.37 boxes (46) 17.61 within sa (47)	+ 36 a water us Sep 101.78 100 kWh/mor 118.77 100 (61) 17.82 ame vess	Oct 105.94 Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42)	Nov 110.09 m(44) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08 24.61		(43) (44) (45) (46)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heatif (46)m= 25.41 22.23 Water storage loss: Storage volume (litres) If community heating a Otherwise if no stored	the table and the table and the table and tabl	ge in litre usage by day (all w Apr ach month 101.78 culated me 133.31 for use (no	es per da 5% if the de 5% if the 5% if the de 5% if the de 5% if the de 5% if the de 5% if the d	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38 storage), 16.56	erage = designed to do	(25 x N) to achieve Aug (43) 97.63 117.37 boxes (46) 17.61 within sa (47)	+ 36 a water us Sep 101.78 100 kWh/mor 118.77 100 (61) 17.82 ame vess	Oct 105.94 Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42)	Nov 110.09 m(44) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08 24.61		(43) (44) (45) (46)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot was Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heatiful (46)m= 25.41 22.23 Water storage loss: Storage volume (litres) If community heating as Otherwise if no stored Water storage loss:	+ 1.76 x ater usage hot water person per Mar r day for ear 105.94 used - calc 152.91 ng at point 22.94 including and no talc hot water series and series a	ge in litre usage by day (all w Apr ach month 101.78 133.31 of use (no	es per da 5% if the d rater use, I May Vd,m = fac 97.63 onthly = 4. 127.91 o hot water 19.19 olar or W velling, e	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38 r storage), 16.56 /WHRS nter 110	erage = designed to ld) Jul Table 1c x 93.47 102.28 enter 0 in 15.34 storage litres in neous co	(25 x N) to achieve Aug (43) 97.63 117.37 boxes (46) 17.61 within sa (47)	+ 36 a water us Sep 101.78 100 kWh/mor 118.77 100 (61) 17.82 ame vess	Oct 105.94 Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42)	Nov 110.09 m(44) ₁₁₂ = sbles 1b, 1 151.09 m(45) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08 24.61		(43) (44) (45) (46) (47)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heati (46)m= 25.41 22.23 Water storage loss: Storage volume (litres) If community heating a Otherwise if no stored Water storage loss: a) If manufacturer's de	+ 1.76 x ater usag hot water person per Mar 105.94 used - call 152.91 152.91 22.94 including and no tall hot water	ge in litre usage by day (all w Apr ach month 101.78 133.31 of use (no 20 and any so ank in dw er (this in	es per da 5% if the d rater use, I May Vd,m = fac 97.63 onthly = 4. 127.91 o hot water 19.19 olar or W velling, e	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38 r storage), 16.56 /WHRS nter 110	erage = designed to ld) Jul Table 1c x 93.47 102.28 enter 0 in 15.34 storage litres in neous co	(25 x N) to achieve Aug (43) 97.63 117.37 boxes (46) 17.61 within sa (47)	+ 36 a water us Sep 101.78 118.77 10 (61) 17.82 ame vess	Oct 105.94 Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42)	Nov 110.09 m(44) ₁₁₂ = 151.09 m(45) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08 24.61		(43) (44) (45) (46) (47)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heati (46)m= 25.41 22.23 Water storage loss: Storage volume (litres) If community heating a Otherwise if no stored Water storage loss: a) If manufacturer's de Temperature factor from	ater usage hot water person per Mar 105.94 152.91 152.91 152.94 1 including and no tale hot water eclared lem Table	ge in litre usage by day (all w Apr ach month 101.78 133.31 of use (not) and any so ank in dw er (this in oss facto 2b	es per da 5% if the d rater use, I May Vd,m = fac 97.63 127.91 hot water 19.19 blar or W relling, e acludes in	y Vd,av lwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38 r storage), 16.56 /WHRS nter 110	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63 97.63 117.37 boxes (46) 17.61 within sa (47) mbi boil	+ 36 a water us Sep 101.78 0 kWh/mor 118.77 17.82 ame vess ers) ente	Oct 105.94 Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42)	9) Nov 110.09 m(44) ₁₁₂ = ables 1b, 1 151.09 m(45) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08 24.61 0		(43) (44) (45) (46) (47) (48) (49)
if TFA > 13.9, N = 1 if TFA £ 13.9, N = 1 Annual average hot wa Reduce the annual average not more that 125 litres per Jan Feb Hot water usage in litres per (44)m= 114.25 110.09 Energy content of hot water (45)m= 169.42 148.18 If instantaneous water heati (46)m= 25.41 22.23 Water storage loss: Storage volume (litres) If community heating a Otherwise if no stored Water storage loss: a) If manufacturer's de	the trust of trust of the trust	ge in litre usage by day (all w Apr ach month 101.78 101.78 133.31 of use (no 20 and any so ank in dw er (this in oss facto 2b k, kWh/ye	es per da 5% if the d ater use, I May Vd,m = fac 97.63 onthly = 4. 127.91 o hot water 19.19 olar or W relling, e acludes in or is knower	ay Vd,av Iwelling is not and co Jun ctor from 7 93.47 190 x Vd,r 110.38 r storage), 16.56 IWHRS nter 110 nstantar	erage = designed to designed t	(25 x N) to achieve Aug (43) 97.63 117.37 boxes (46) 17.61 within sa (47)	+ 36 a water us Sep 101.78 0 kWh/mor 118.77 17.82 ame vess ers) ente	Oct 105.94 Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42) Total = Sunth (see Tail 138.42)	9) Nov 110.09 m(44) ₁₁₂ = ables 1b, 1 151.09 m(45) ₁₁₂ = 22.66	3.86 Dec 114.25 c, 1d) 164.08 24.61		(43) (44) (45) (46) (47)

Hot water storage loss factor from Table 2 (kWh/litre/day))		0		(51)
If community heating see section 4.3					
Volume factor from Table 2a			0		(52)
Temperature factor from Table 2b			0		(53)
Energy lost from water storage, kWh/year	(47) x (51) x ((52) x (53) =	0		(54)
Enter (50) or (54) in (55)			0		(55)
Water storage loss calculated for each month	((56)m = (55)) × (41)m			
(56)m= 0 0 0 0 0 0	0 0	0 0	0	0	(56)
If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11	1)] ÷ (50), else (57)m	n = (56)m where (F	H11) is from	n Appendi	хH
(57)m= 0 0 0 0 0 0	0 0	0 0	0	0	(57)
Primary circuit loss (annual) from Table 3			0		(58)
Primary circuit loss calculated for each month (59)m = (58)	8) ÷ 365 × (41)m				
(modified by factor from Table H5 if there is solar water	heating and a cy	ylinder thermos	stat)		
(59)m= 0 0 0 0 0 0	0 0	0 0	0	0	(59)
Combi loss calculated for each month (61)m = (60) ÷ 365 :	× (41)m				
	``í 	25.47 26.39	25.61	26.5	(61)
Total heat required for water heating calculated for each m	month (62)m = 0	85 x (45)m + (57)m +	(59)m + (61)m
	<u> </u>	44.24 164.8	<u> </u>	190.58	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative q					(*)
(add additional lines if FGHRS and/or WWHRS applies, se		no solal contributi	on to water	ricating)	
(63)m= 0 0 0 0 0 0 0	0 0	0 0	0	0	(63)
Output from water heater					, ,
Output from water fleater					
(64)m= 195.95 172.12 179.36 158.84 154.24 135.78 12	128.48 143.65 14	44.24 164.8	176.71	190.58	
(64)m= 195.95 172.12 179.36 158.84 154.24 135.78 12		44.24 164.8 from water heater		190.58	1944 73 (64)
	Output f	from water heater	(annual) ₁₁	12	1944.73 (64)
Heat gains from water heating, kWh/month 0.25 ′ [0.85 × (Output f (45)m + (61)m] +	from water heater + 0.8 x [(46)m -	(annual) ₁₁ + (57)m +	12 + (59)m]
Heat gains from water heating, kWh/month 0.25 ′ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4	Output 1 (45)m + (61)m] + 40.56 45.6 4	from water heater + 0.8 x [(46)m - 45.86 52.62	(annual) ₁₁ + (57)m +	12 + (59)m 61.18	[65]
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in	Output 1 (45)m + (61)m] + 40.56 45.6 4	from water heater + 0.8 x [(46)m - 45.86 52.62	(annual) ₁₁ + (57)m +	12 + (59)m 61.18	[65]
Heat gains from water heating, kWh/month 0.25 ′ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4	Output 1 (45)m + (61)m] + 40.56 45.6 4	from water heater + 0.8 x [(46)m - 45.86 52.62	(annual) ₁₁ + (57)m +	12 + (59)m 61.18	[65]
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	Output (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86	(annual) ₁₁ + (57)m + 56.64	12 + (59)m 61.18 nunity h	[65]
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun	Output (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from	(annual) ₁₁ + (57)m + 56.64 om comm	12 + (59)m 61.18 nunity h] (65) eating
Heat gains from water heating, kWh/month 0.25 ′ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun	Output (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86	(annual) ₁₁ + (57)m + 56.64 om comm	12 + (59)m 61.18 nunity h	[65]
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun	Output (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86	(annual) ₁₁ + (57)m + 56.64 om comm	12 + (59)m 61.18 nunity h] (65) eating
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output f (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86	(annual) ₁₁ + (57)m + 56.64 om comm	12 + (59)m 61.18 nunity h] (65) eating
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output f (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86	(annual) ₁₁ + (57)m + 56.64 om comm	Dec 146.65	[(65) eating (66)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65	Dec 146.65	[(65) eating (66)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65	Dec 146.65	[65] eating (66) (67)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65	Dec 146.65	[65] eating (66) (67)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65 27.48	Dec 146.65	[(65) eating (66) (67) (68)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65 27.48	Dec 146.65	[(65) eating (66) (67) (68)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (666)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 om comm Nov 146.65 27.48 284.53	Dec 146.65 29.3 305.65 37.67	[] (65) eating (66) (67) (68) (69)
Heat gains from water heating, kWh/month 0.25 ′ [0.85 x (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65 27.48 284.53	Dec 146.65 29.3 305.65 37.67	[] (65) eating (66) (67) (68) (69) (70)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65 27.48 284.53	Dec 146.65 29.3 305.65 37.67	[] (65) eating (66) (67) (68) (69)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (65)m= 62.96 55.25 57.45 50.71 49.11 43.05 4 include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun (66)m= 146.65	Output for (45)m + (61)m] + 40.56	from water heater + 0.8 x [(46)m - 45.86 52.62 hot water is from the second	(annual) ₁₁ + (57)m + 56.64 Dom common Nov 146.65 27.48 284.53	Dec 146.65 29.3 305.65 37.67	[] (65) eating (66) (67) (68) (69) (70)

73)m= 502.89	500.62	482.53	452.93	422.11	392.9	374.36	38	396.5	426.33	3 460.68	487.18		(7:
6. Solar gains		402.00	402.00	722.11	002.00	3 014.00		000.0	420.00	3 400.00	407.10		(-
Solar gains are		using sola	r flux from	Table 6a	and ass	ociated equa	tions t	o convert to th	ne applic	able orientat	ion.		
Orientation: A	Access F	actor	Area			lux		g_		FF		Gains	
	Table 6d		m²		Т	able 6a		Table 6b		Table 6c		(W)	
outheast 0.9x	0.77	X	24.	18	x	36.79	х	0.53	x	0.7	=	228.74	(7
outheast 0.9x	0.77	X	24.	18	x	62.67	х	0.53	x	0.7	=	389.63	(7
outheast 0.9x	0.77	X	24.	18	x	85.75	х	0.53	x	0.7	_	533.1	(7
outheast 0.9x	0.77	X	24.	18	x	106.25	х	0.53	x	0.7	=	660.54	(7
outheast 0.9x	0.77	X	24.	18	x	119.01	х	0.53	x	0.7	=	739.86	(7
outheast 0.9x	0.77	X	24.	18	x	118.15	х	0.53	x	0.7	=	734.51	(7
outheast 0.9x	0.77	X	24.	18	x	113.91	х	0.53	x	0.7	=	708.15	(7
outheast 0.9x	0.77	X	24.	18	x	104.39	х	0.53	x	0.7	=	648.97	(7
outheast 0.9x	0.77	X	24.	18	x	92.85	х	0.53	x	0.7	_	577.24	<u> </u>
outheast _{0.9x}	0.77	X	24.	18	x	69.27	х	0.53	x	0.7	=	430.62	(7
outheast 0.9x	0.77	X	24.	18	x	44.07	х	0.53	x	0.7	=	273.98	(7
outheast 0.9x	0.77	X	24.	18	x	31.49	х	0.53	x	0.7	_ =	195.75	<u> </u>
outhwest _{0.9x}	0.77	X	2.9	94	x	36.79		0.53	x	0.7	=	27.81	<u> </u>
outhwest _{0.9x}	0.77	x	2.9	94	x	62.67	İ	0.53	x	0.7		47.37	(
outhwest _{0.9x}	0.77	X	2.9	94	x	85.75	İ	0.53	x	0.7	_ =	64.82	<u> </u>
outhwest _{0.9x}	0.77	х	2.9	94	x	106.25	İ	0.53	х	0.7	=	80.31	<u> </u>
outhwest _{0.9x}	0.77	x	2.9	94	х	119.01	İ	0.53	x	0.7	=	89.96	<u> </u>
outhwest _{0.9x}	0.77	х	2.9	94	х	118.15	İ	0.53	x	0.7	=	89.31	<u> </u>
outhwest _{0.9x}	0.77	х	2.9	94	x	113.91	İ	0.53	х	0.7	=	86.1	<u> </u>
outhwest _{0.9x}	0.77	x	2.9	94	x	104.39	İ	0.53	x	0.7	=	78.91	
outhwest _{0.9x}	0.77	х	2.9	94	x	92.85	İ	0.53	х	0.7	-	70.19	<u> </u>
outhwest _{0.9x}	0.77	х	2.9	94	х	69.27	İ	0.53	x	0.7	=	52.36	<u> </u>
outhwest _{0.9x}	0.77	X	2.9	94	x	44.07	İ	0.53	x	0.7	=	33.31	<u> </u>
outhwest _{0.9x}	0.77	х	2.9	94	х	31.49	İ	0.53	х	0.7	-	23.8	(
orthwest 0.9x	0.77	X	26.	58	х	11.28	х	0.53	х	0.7	=	77.11	<u> </u>
orthwest 0.9x	0.77	X	26.	58	x	22.97	х	0.53	×	0.7	=	156.95	<u> </u>
orthwest 0.9x	0.77	X	26.	58	х	41.38	х	0.53	x	0.7	=	282.77	
orthwest 0.9x	0.77	X	26.	58	х	67.96	х	0.53	x	0.7	=	464.4	<u> </u>
orthwest 0.9x	0.77	X	26.	58	х	91.35	х	0.53	×	0.7	=	624.24	
orthwest 0.9x	0.77	x	26.	58	x	97.38	х	0.53	×	0.7	=	665.51	
orthwest 0.9x	0.77	X	26.	58	x	91.1	x	0.53	×	0.7		622.57	
orthwest 0.9x	0.77	x	26.		x	72.63	х	0.53	x	0.7		496.32	
orthwest _{0.9x}	0.77	X	26.		x	50.42	x	0.53	x	0.7	=	344.56	= (
lorthwest _{0.9x}	0.77		26.		<u> </u>	28.07	ı L		=	0.7	_	000	=(`

	_											_					
Northwe	st 0.9x	0.77	X	26.	58	X	1	4.2	х	0.53		x [0.7		=	97.02	(81)
Northwe	st 0.9x	0.77	X	26.	58	X	9).21	x	0.53		x	0.7		=	62.97	(81)
Rooflight	ts _{0.9x}	1	X	9.7	9	X		26	x	0.53		х [0.8		=	97.13	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x		54	x	0.53		x	0.8		=	201.74	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x		96	x	0.53		x [0.8		=	358.64	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x	1	150	x	0.53		x [0.8		=	560.38	(82)
Rooflight	ts 0.9x	1	X	9.7	9	x	1	192	x	0.53		x	0.8		=	717.29	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x	2	200	х	0.53		х	0.8		=	747.17	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x	1	189	х	0.53		х	0.8		=	706.08	(82)
Rooflight	ts 0.9x	1	X	9.7	9	x	1	157	x	0.53		x	0.8		=	586.53	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x	1	115	х	0.53		х	0.8		=	429.62	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x		66	х	0.53		х	0.8		=	246.57	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x		33	х	0.53		х	0.8		=	123.28	(82)
Rooflight	ts _{0.9x}	1	X	9.7	9	x		21	х	0.53		x	0.8		=	78.45	(82)
						•						_					
Solar ga	ains in v	vatts, ca	lculated	for eacl	n month	<u> </u>			(83)m	= Sum(74)	m(8	32)m					
` ′	430.79		1239.34			_		2122.89	1810	.72 1421.6	61 9:	21.35	527.59	360.9	97		(83)
Total ga	ains – in	ternal a			(73)m	+ (8	33)m ,	watts					_			1	
(84)m=	933.68	1296.3	1721.87	2218.56	2593.45	26	29.45	2497.25	2191	.72 1818.	11 13	347.68	988.27	848.	15		(84)
7. Mea	an intern	nal temp	erature ((heating	season	າ)											
Tempe	erature o	during h	eating p	eriods ir	the livi	ng	area f	rom Tab	ole 9,	Th1 (°C)						21	(85)
Utilisat	tion fact	or for ga	ains for l	iving are	a, h1,m	ı (s	ee Tal	ble 9a)									
Utilisat [tion fact Jan	or for ga	ains for li Mar	iving are Apr	a, h1,m May	ΤÌ	ee Tal Jun	ble 9a) Jul	Αι	ıg Sej	ρ	Oct	Nov	De	ec		_
Utilisat (86)m=			ī			Ĺ			Au 0.4			Oct	Nov 0.97	De 0.99			(86)
(86)m=	Jan 0.99	Feb 0.96	Mar 0.91	Apr 0.8	May 0.65	(Jun 0.49	Jul 0.37	0.4	3 0.67			+				(86)
(86)m=	Jan 0.99	Feb 0.96	Mar 0.91	Apr 0.8	May 0.65	ollo	Jun 0.49	Jul 0.37	0.4	3 0.67 able 9c)			+		9		(86)
(86)m= Mean i (87)m=	Jan 0.99 internal 18.67	Feb 0.96 tempera 19.06	0.91 ature in 1	Apr 0.8 iving are	May 0.65 ea T1 (fo 20.7	ollo	Jun 0.49 w ster 20.9	Jul 0.37 os 3 to 7 20.97	0.4 ' in T	3 0.67 able 9c)	6 :	0.9	0.97	0.99	9		` ,
(86)m= Mean i (87)m= Tempe	Jan 0.99 internal 18.67	Feb 0.96 tempera 19.06	0.91 ature in 1	Apr 0.8 iving are	May 0.65 ea T1 (fo 20.7	ollo dw	Jun 0.49 w ster 20.9	Jul 0.37 os 3 to 7 20.97	0.4 ' in T	3 0.67 able 9c) 95 20.76	6 : (i)	0.9	0.97	0.99	9		` ,
(86)m=	Jan 0.99 internal 18.67 erature 0 19.71	Feb 0.96 tempera 19.06 during he	Mar 0.91 ature in I 19.64 eating p	Apr 0.8 iving are 20.27 eriods ir 19.72	May 0.65 ea T1 (for 20.7 or rest of 19.72	ollo dw	Jun 0.49 w step 20.9 relling 9.72	Jul 0.37 os 3 to 7 20.97 from Ta 19.72	0.4 7 in T 20.9 able 9	3 0.67 able 9c) 95 20.76	6 : (i)	20.1	0.97	0.99	9		(87)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat	Jan 0.99 internal 18.67 erature of 19.71 tion fact	Feb 0.96 tempera 19.06 during he 19.71 or for ga	Mar 0.91 ature in I 19.64 eating p 19.71 ains for r	Apr 0.8 iving are 20.27 eriods ir 19.72 est of de	May 0.65 ea T1 (for 20.7) a rest of 19.72 welling,	ollo dw 1	Jun 0.49 w step 20.9 relling 9.72 m (se	Jul 0.37 0s 3 to 7 20.97 from Ta 19.72 e Table	0.4 7 in T 20.9 able 9 19.7	3 0.67 able 9c) 95 20.76 0, Th2 (°C	5 ; 5) 2 1	0.9 20.1 19.72	19.24	0.99 18.5	9		(87)
(86)m=	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96	Mar 0.91 ature in I 19.64 eating personal points for r 0.9	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77	May 0.65 ea T1 (for 20.7 or rest of 19.72 welling, 0.58	dw 1	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4	Jul 0.37 0s 3 to 7 20.97 from Ta 19.72 e Table 0.27	0.4 7 in T 20.9 able 9 19.7 9a) 0.3	3 0.67 able 9c) 95 20.76 0, Th2 (°C 73 19.72	5 2 1	0.9 20.1 19.72 0.87	0.97	0.99	9		(87)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal	Feb 0.96 tempera 19.06 during hearing for for gas 0.96 tempera	Mar 0.91 ature in I 19.64 eating p 19.71 ains for r 0.9 ature in t	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77 the rest	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell	ollo dw 1 h2,	Jun 20.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc	Jul 0.37 0s 3 to 7 20.97 from Ta 19.72 e Table 0.27	0.4 7 in T 20.9 able 9 19.7 9a) 0.3	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta	6 2 6) 2 1	0.9 20.1 19.72 0.87 9c)	0.97 19.24 19.72 0.97	0.99 18.5 19.7	9		(87) (88) (89)
(86)m=	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96	Mar 0.91 ature in I 19.64 eating personal points for r 0.9	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77	May 0.65 ea T1 (for 20.7 or rest of 19.72 welling, 0.58	ollo dw 1 h2,	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4	Jul 0.37 0s 3 to 7 20.97 from Ta 19.72 e Table 0.27	0.4 7 in T 20.9 able 9 19.7 9a) 0.3	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta	6 2 2 1 1 able 9 2	0.9 20.1 19.72 0.87 9c)	0.97 19.24 19.72 0.97	0.99 18.5 19.7 0.99	9		(87) (88) (89) (90)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal	Feb 0.96 tempera 19.06 during hearing for for gas 0.96 tempera	Mar 0.91 ature in I 19.64 eating p 19.71 ains for r 0.9 ature in t	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77 the rest	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell	ollo dw 1 h2,	Jun 20.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc	Jul 0.37 0s 3 to 7 20.97 from Ta 19.72 e Table 0.27	0.4 7 in T 20.9 able 9 19.7 9a) 0.3	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta	6 2 2 1 1 able 9 2	0.9 20.1 19.72 0.87 9c)	0.97 19.24 19.72 0.97	0.99 18.5 19.7 0.99	9	0.34	(87) (88) (89)
(86)m=	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21	Mar 0.91 19.64 eating p 19.71 ains for r 0.9 ature in t 18.03	Apr 0.8 iving are 20.27 eriods ir 19.72 est of dv 0.77 the rest	May 0.65 ea T1 (for 20.7 or rest of 19.72 welling, 0.58 of dwell 19.43	ollo dw 1 h2, ing 1	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66	Jul 0.37 20.97 from Ta 19.72 e Table 0.27 bllow ste 19.71	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta	6 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.9 20.1 19.72 0.87 9c)	0.97 19.24 19.72 0.97	0.99 18.5 19.7 0.99	9	0.34	(87) (88) (89) (90)
(86)m=	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21	Mar 0.91 19.64 eating p 19.71 ains for r 0.9 ature in t 18.03	Apr 0.8 iving are 20.27 eriods ir 19.72 est of dv 0.77 the rest	May 0.65 ea T1 (for 20.7 or rest of 19.72 welling, 0.58 of dwell 19.43	dw 1 h2, ing 1	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66	Jul 0.37 20.97 from Ta 19.72 e Table 0.27 bllow ste 19.71	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta 7 19.52	6 2 1 1 (able \$ 2 fLA	0.9 20.1 19.72 0.87 9c)	0.97 19.24 19.72 0.97	0.99 18.5 19.7 0.99	9 72 9	0.34	(87) (88) (89) (90)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i (90)m= Mean i (92)m= Apply a	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 eent to th	Mar 0.91 ature in I 19.64 eating pr 19.71 ains for r 0.9 ature in t 18.03 ature (for 18.58) he mean	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77 the rest 18.9 r the wh 19.36 internal	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwell 19.86	ollo z dw 1 h2, ing 1 z atu	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 g) = fL 0.08	Jul 0.37 ps 3 to 7 20.97 from Ta 19.72 e Table 0.27 bllow ste 19.71 A × T1 20.14 m Table	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1 - 20.1	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta 7 19.52 - fLA) x 7 13 19.94 where app	6 2 1 1 (able \$ 2 fLA	0.9 20.1 19.72 0.87 9c) 18.7 = Livi	0.97 19.24 19.72 0.97 17.48 ing area ÷ (4	0.99 18.5 19.7 0.99 16.5 4) =	9	0.34	(87) (88) (89) (90) (91) (92)
(86)m=	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm 17.33	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 ent to th	Mar 0.91 19.64 eating p 19.71 ains for r 0.9 ature in t 18.03 ature (fo 18.58 ne mean 18.58	Apr 0.8 iving are 20.27 eriods ir 19.72 est of dv 0.77 the rest 18.9 r the wh 19.36	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwell 19.86	ollo z dw 1 h2, ing 1 z atu	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 g) = fL	Jul 0.37 0.37 0.37 20.97 from Ta 19.72 e Table 0.27 ollow ste 19.71 A × T1 20.14	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1 - 20.1	3 0.67 able 9c) 05 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta 7 19.52 - fLA) × T 13 19.94 where ap	6 2 1 1 (able \$ 2 fLA	0.9 20.1 19.72 0.87 9c) 18.7 = Livi	0.97 19.24 19.72 0.97 17.48 ing area ÷ (4	0.99 18.5 19.7 0.99 16.5	9	0.34	(87) (88) (89) (90) (91)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i (90)m= Mean i (92)m= Apply a (93)m= 8. Spa	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm 17.33 ce heat	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 ent to th 17.84 ing required	Mar 0.91 ature in I 19.64 eating per 19.71 ains for r 0.9 ature in t 18.03 ature (for 18.58 ne mean 18.58 irement	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77 the rest 18.9 r the wh 19.36 internal 19.36	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwe 19.86 temper 19.86	ollo dw 1 h2, ing 1 ratu 2	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 g) = fL 0.08 re from 0.08	Jul 0.37 os 3 to 7 20.97 from Ta 19.72 e Table 0.27 ollow ste 19.71 A × T1 20.14 m Table 20.14	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1 - 20.1	3 0.67 able 9c) 20.76 0, Th2 (°C 73 19.72 2 0.58 to 7 in Ta 7 19.52 - fLA) × T 13 19.94 where ap	6 2 1 1 (nable § 2 fLA 1 propring 1 1	0.9 20.1 19.72 0.87 9c) 18.7 = Liv	0.97 19.24 19.72 0.97 17.48 ing area ÷ (4) 18.07	0.99 18.5 19.7 0.99 16.5 17.2	9		(87) (88) (89) (90) (91) (92)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i (90)m= Mean i (92)m= Apply a (93)m= 8. Spa Set Ti	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm 17.33 ce heat to the m	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 ent to th 17.84 ing requires	Mar 0.91 19.64 eating portion for r 0.9 ature in t 18.03 ature (for 18.58) ature mean 18.58 irement ernal ten	Apr 0.8 iving are 20.27 eriods ir 19.72 est of dv 0.77 the rest 18.9 r the wh 19.36 internal 19.36	May 0.65 ea T1 (for 20.7) n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwell 19.86 temper 19.86	ollo dw 1 h2, ing 1 ratu 2	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 g) = fL 0.08 re from 0.08	Jul 0.37 os 3 to 7 20.97 from Ta 19.72 e Table 0.27 ollow ste 19.71 A × T1 20.14 m Table 20.14	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1 - 20.1	3 0.67 able 9c) 20.76 0, Th2 (°C 73 19.72 2 0.58 to 7 in Ta 7 19.52 - fLA) × T 13 19.94 where ap	6 2 1 1 (nable § 2 fLA 1 propring 1 1	0.9 20.1 19.72 0.87 9c) 18.7 = Liv	0.97 19.24 19.72 0.97 17.48 ing area ÷ (4	0.99 18.5 19.7 0.99 16.5 17.2	9		(87) (88) (89) (90) (91) (92)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i (90)m= Mean i (92)m= Apply a (93)m= 8. Spa Set Ti	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm 17.33 ce heat to the m lisation fact	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 ent to th 17.84 ing requence interfactor for	Mar 0.91 ature in l 19.64 eating pr 19.71 ains for r 0.9 ature in t 18.03 ature (for 18.58 are mean 18.58 irement er gains terring in ter	Apr 0.8 iving are 20.27 eriods in 19.72 est of do 0.77 the rest 18.9 r the wh 19.36 internal 19.36 nperaturusing Ta	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwe 19.86 temper 19.86 re obtain ble 9a	dw 1 h2, ing 1 ratured 2 ratured 2	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 0.08 re from 0.08 at ste	Jul 0.37 ps 3 to 7 20.97 from Ta 19.72 e Table 0.27 pllow ste 19.71 A × T1 20.14 m Table 20.14	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1- 20.1 4e, v 20.1	3 0.67 able 9c) 95 20.76 7, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta 7 19.52 — fLA) × T 13 19.94 where appling 19.94 e 9b, so the	6 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.9 20.1 19.72 0.87 9c) 18.7 = Liv	0.97 19.24 19.72 0.97 17.48 Ing area ÷ (4) 18.07 (76)m and	0.99 18.5 19.7 0.99 16.5 17.2 d re-c	9 69 72 9 63		(87) (88) (89) (90) (91) (92)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i (90)m= Apply a (93)m= 8. Spa Set Ti the util	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm 17.33 ce heat to the m lisation fact	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 lent to th 17.84 ing required factor fo Feb	Mar 0.91 ature in I 19.64 eating per 19.71 ains for r 0.9 ature in t 18.03 ature (for 18.58 are mean 18.58 irement ernal ten r gains to Mar	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77 the rest 18.9 r the wh 19.36 internal 19.36 internal using Ta Apr	May 0.65 ea T1 (for 20.7) n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwell 19.86 temper 19.86	dw 1 h2, ing 1 ratured 2 ratured 2	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 g) = fL 0.08 re from 0.08	Jul 0.37 os 3 to 7 20.97 from Ta 19.72 e Table 0.27 ollow ste 19.71 A × T1 20.14 m Table 20.14	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1 - 20.1	3 0.67 able 9c) 95 20.76 7, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta 7 19.52 — fLA) × T 13 19.94 where appling 19.94 e 9b, so the	6 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.9 20.1 19.72 0.87 9c) 18.7 = Liv	0.97 19.24 19.72 0.97 17.48 ing area ÷ (4) 18.07	0.99 18.5 19.7 0.99 16.5 17.2	9 69 72 9 63		(87) (88) (89) (90) (91) (92)
(86)m= Mean i (87)m= Tempe (88)m= Utilisat (89)m= Mean i (90)m= Apply a (93)m= 8. Spa Set Ti the util	Jan 0.99 internal 18.67 erature of 19.71 tion fact 0.98 internal 16.64 internal 17.33 adjustm 17.33 ce heat to the m lisation fact	Feb 0.96 tempera 19.06 during he 19.71 or for ga 0.96 tempera 17.21 tempera 17.84 lent to th 17.84 ing required factor fo Feb	Mar 0.91 ature in l 19.64 eating pr 19.71 ains for r 0.9 ature in t 18.03 ature (for 18.58 are mean 18.58 irement er gains terring in ter	Apr 0.8 iving are 20.27 eriods ir 19.72 est of do 0.77 the rest 18.9 r the wh 19.36 internal 19.36 internal using Ta Apr	May 0.65 ea T1 (for 20.7 n rest of 19.72 welling, 0.58 of dwell 19.43 ole dwe 19.86 temper 19.86 re obtain ble 9a	dw 1 h2, ing 1 ratu 2	Jun 0.49 w step 20.9 relling 9.72 m (se 0.4 T2 (fc 9.66 0.08 re from 0.08 at ste	Jul 0.37 ps 3 to 7 20.97 from Ta 19.72 e Table 0.27 pllow ste 19.71 A × T1 20.14 m Table 20.14	0.4 7 in T 20.9 able 9 19.7 9a) 0.3 eps 3 19. + (1- 20.1 4e, v 20.1	3 0.67 able 9c) 95 20.76 0, Th2 (°C) 73 19.72 2 0.58 to 7 in Ta 7 19.52 fLA) × 1 13 19.94 where apl 13 19.94 e 9b, so the	6 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.9 20.1 19.72 0.87 9c) 18.7 = Liv	0.97 19.24 19.72 0.97 17.48 Ing area ÷ (4) 18.07 (76)m and	0.99 18.5 19.7 0.99 16.5 17.2 d re-c	99 99 99 33 33 23		(87) (88) (89) (90) (91) (92)

l leaf	ul aaine	hmGm	, W = (94	1\m v (8.	1)m									
(95)m=		1218.87	· `	<u> </u>	1533.62	1119.65	749.11	778.06	1089.21	1144.56	941.8	829.95		(95)
			ernal tem	<u> </u>			7 10.11	770.00	1000.21	1111.00	011.0	020.00		(==)
(96)m=	<u> </u>	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 tempe	erature,	Lm , W =	=[(39)m :	x [(93)m	– (96)m]				
(97)m=	2857.26	2834.68	2642.62	2278.75	1776.16	1187.43	766.49	806.56	1267.87	1865.55	2392.03	2845.6		(97)
Spac	e heatin	g requir	ement fo	r each n	nonth, k\	Wh/mon	h = 0.02	24 x [(97))m – (95)m] x (4 ⁻	1)m			
(98)m=	1450.03	1085.82	845.04	437.78	180.45	0	0	0	0	536.42	1044.17	1499.64		
								Tota	l per year	(kWh/year	r) = Sum(98	8) _{15,912} =	7079.35	(98)
Spac	e heatin	g requir	ement in	kWh/m²	²/year								47.42	(99)
9a. Er	nergy red	quiremer	nts – Indi	ividual h	eating sy	ystems i	ncluding	micro-C	CHP)					
•	e heati	_										-		_
Fract	tion of sp	pace hea	at from s	econdar	y/supple	mentary	-					<u> </u>	0	(201)
Fract	tion of sp	pace hea	at from m	nain syst	em(s)			(202) = 1 -	- (201) =			Ĺ	1	(202)
Fract	tion of to	tal heati	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Effici	ency of	main spa	ace heat	ing syste	em 1								93.2	(206)
Effici	ency of	seconda	ry/suppl	ementar	y heating	g system	າ, %						0	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	ar
Spac	e heatin	g requir	ement (c	alculate	d above)									
	1450.03	1085.82	845.04	437.78	180.45	0	0	0	0	536.42	1044.17	1499.64		
(211)r	$m = \{[(98)]\}$	s)m x (20)4)] } x 1	00 ÷ (20	06)									(211)
	1555.83	1165.04	906.7	469.72	193.61	0	0	0	0	575.56	1120.35			
								Tota	I (kWh/yea	ar) =Sum(2	211) _{15,1012}	=	7595.87	(211)
Spac	e heatin	g fuel (s	econdar	y), kWh/	month									
		1	00 ÷ (20		ı			ı						
(215)m	0	0	0	0	0	0	0	0	0	0	0	0		_
								Tota	il (kwh/yea	ar) =Sum(2	215) _{15,1012}	_ [0	(215)
	heating		/	ام ام معملی	l \									
Outpu	195.95	172.12	ter (calc 179.36	158.84	154.24	135.78	128.48	143.65	144.24	164.8	176.71	190.58		
Efficie	ncy of w	ļ	ı ater		<u> </u>								87.3	(216)
(217)m:		89.79	89.68	89.41	88.84	87.3	87.3	87.3	87.3	89.5	89.77	89.86		(217)
Fuel fo	or water	heating,	, kWh/mo	onth										
, ,) ÷ (217)						1					
(219)m	218.1	191.68	200	177.66	173.61	155.53	147.17	164.55	165.22	184.14	196.85	212.08		_
								Tota	I = Sum(2			L	2186.57	(219)
	al totals		ed, main	evetom	1					k\	Wh/year	Ē	kWh/yea	<u>,</u>
•	_			System	1							[7595.87	╡
	heating											Ĺ	2186.57	
Electr	icity for p	oumps, f	ans and	electric	keep-ho	t					-			
centr	al heatir	ng pump	:									30		(230c)

boiler with a fan-assisted flue		45	(230e)
Total electricity for the above, kWh/year	sum of (230	0a)(230g) =	75 (231)
Electricity for lighting			503.44 (232)
Electricity generated by PVs			-815.12 (233)
12a. CO2 emissions – Individual heating system	s including micro-CHP		
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	1640.71 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	472.3 (264)
Space and water heating	(261) + (262) + (263) + (264) =		2113.01 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	261.29 (268)
Energy saving/generation technologies Item 1		0.519 =	-423.05 (269)
Total CO2, kg/year	sur	m of (265)(271) =	1990.17 (272)
Dwelling CO2 Emission Rate	(27	(2) ÷ (4) =	13.33 (273)

El rating (section 14)

(274)