Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.17 *Printed on 16 June 2023 at 14:55:56*

Project Information:

Assessed By: Ben Talbutt (STRO036639) Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 77.11m²

Site Reference: Fosters Estate Block D

Plot Reference: D1-05

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: Electricity (c)

Fuel factor: 1.55 (electricity (c))

Target Carbon Dioxide Emission Rate (TER) 29.01 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 12.34 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 60.5 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 53.4 kWh/m²

OK

2 Fabric U-values

 Element
 Average
 Highest

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

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

Roof 0.10 (max. 0.20) 0.10 (max. 0.35) **OK**Openings 1.34 (max. 2.00) 1.40 (max. 3.30) **OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

Maximum 10.0 **OK**

4 Heating efficiency

Main Heating system: Community heating schemes - Heat pump

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

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:	0.61	
Maximum	1.5	OK
MVHR efficiency:	88%	
Minimum	70%	OK
9 Summertime temperature		
Overheating risk (Thames valley):	Not assessed	?
10 Key features		
Air permeablility	3.0 m³/m²h	
Doors U-value	0.91 W/m²K	
Roofs U-value	0.1 W/m ² K	
Community heating, heat from electric heat pump		

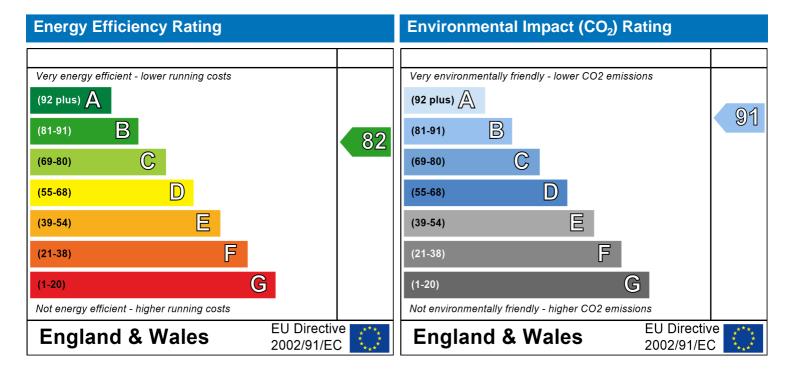
Predicted Energy Assessment



Dwelling type:
Date of assessment:
Produced by:
Total floor area:

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.

Mid floor Flat

Ben Talbutt

77.11 m²

13 October 2022

SAP Input

Property Details: D1-05

Address:

Located in: England Region: Thames valley

UPRN:

Date of assessment: 13 October 2022 Date of certificate: 16 June 2023

Assessment type: New dwelling design stage

Transaction type:

Tenure type:

Related party disclosure:

Thermal Mass Parameter:

New dwelling

Unknown

No related party

Indicative Value Medium

Water use <= 125 litres/person/day: True

PCDF Version: 505

Property description:

Dwelling type: Flat

Detachment:

Year Completed: 2022

Floor Location: Floor area:

Storey height:

Floor 0 77.11 m² 2.82 m

Living area: 27.54 m² (fraction 0.357)

Front of dwelling faces: Unspecified

- ()	$n \cap n$	Ina -	†\ /I	nnei
U	uen		ΙVΙ	pes:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
Front Door	Manufacturer	Solid			Wood
Win 1	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 2	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 3	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 4	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 5	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 6	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 7	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	
Win 8	Manufacturer	Windows	low-E, $En = 0.05$, soft coat	No	

Name:	Gap:	Frame Fa	actor: g-value:	U-value:	Area:	No. of Openings:
Front Door	mm	1	0	0.91	2.52	1
Win 1	16mm or more	0.8	0.4	1.4	2.9	1
Win 2	16mm or more	0.8	0.4	1.4	5.45	1
Win 3	16mm or more	0.8	0.4	1.4	1.99	2
Win 4	16mm or more	0.8	0.4	1.4	0.9	1
Win 5	16mm or more	0.8	0.4	1.4	0.62	1
Win 6	16mm or more	0.8	0.4	1.4	1.99	1
Win 7	16mm or more	0.8	0.4	1.4	0.9	2
Win 8	16mm or more	0.8	0.4	1.4	1.99	1

Name: Front Door	Type-Name:	Location: Ext Wall	Orient: North East	Width: 1.05	Height: 2.4
Win 1		Ext Wall	South East	1.47	1.97
Win 2		Ext Wall	South East	2.27	2.4
Win 3		Ext Wall	North West	1.02	1.95
Win 4		Ext Wall	North West	0.46	1.95
Win 5		Ext Wall	North West	0.46	1.35
Win 6		Ext Wall	South West	1.02	1.95
Win 7		Ext Wall	South West	0.46	1.95

SAP Input

Win 8 Ext Wall North East 1.02 1.95 Overshading: Average or unknown Type: Gross area: Openings: Net area: U-value: Ru value: Curtain wall: Kappa: **External Elements** Ext Wall 76.47 22.15 54.32 0.14 0 False N/A Common Area Wall 21.38 0 21.38 0.2 0.9 False N/A Concrete Column 0 7.05 0.2 False N/A 7.05 0 Roof 77.11 0 77.11 0.1 0 N/A **Internal Elements** Party Elements User-defined (individual PSI-values) Y-Value = 0.0762 Thermal bridges: Length Psi-value Other lintels (including other steel lintels) [Approved] 10.71 0.3 E2 Sill [Approved] 7.39 0.04 E3 [Approved] 43.54 0.05 E4 Jamb Party floor between dwellings (in blocks of flats) [Approved] 28.41 0.07 E7 Corner (normal) 14.1 0.09 E16 [Approved] Flat roof 35.34 0.08 E14 [Approved] 2.82 -0.09E17 Corner (inverted internal area greater than external area) [Approved] E5 Ground floor (normal) 0 0.16 Intermediate floor within a dwelling [Approved] 0 0.07 E6 Exposed floor (normal) 0 0.32 E20 Party wall between dwellings [Approved] 0 0.06 E18 Eaves (insulation at ceiling level - inverted) 6.93 0.12 E24 Ground floor P1 9.45 0.16 Intermediate floor within a dwelling 9.45 0 P2 Intermediate floor between dwellings (in blocks of flats) 9.45 0 Р3 Р8 Exposed floor (inverted) 0 0.24 Roof (insulation at ceiling level) 0 0.24 P4 Yes (As designed) Pressure test: Balanced with heat recovery Ventilation: Number of wet rooms: Kitchen + 1 Ductwork: Insulation, Rigid Approved Installation Scheme: True Number of chimneys: 0 0 Number of open flues: 0 Number of fans: 0 Number of passive stacks: Number of sides sheltered: 2 Pressure test: 3 Community heating schemes Main heating system: Heat source: Community heat pump heat from electric heat pump, heat fraction 1, efficiency 383 Piping>=1991, pre-insulated, low temp, variable flow

Charging system linked to use of community heating, programmer and at least two room

thermostats

Main heating Control:

SAP Input

Control code: 2312

Secondary heating system:

Secondary heating system: None

Water heating:

Water heating: From main heating system

Water code: 901

Fuel :heat from boilers - mains gas

No hot water cylinder Solar panel: False

Others

Electricity tariff: Standard Tariff
In Smoke Control Area: Unknown
Conservatory: No conservatory

Low energy lights: 100%

Terrain type: Low rise urban / suburban

EPC language: English Wind turbine: No Photovoltaics: None Assess Zero Carbon Home: No

		l lser I	Details:						
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012	<u> </u>	Strom Softwa					036639 on: 1.0.5.17	
	F	Property	Address	: D1-05					
Address :									
Overall dwelling dime	ensions:	Δ = 0	a/m²\		Av. Ua	iaht(m)		Valuma/m³	81
Ground floor			77.11	(1a) x		ight(m)	(2a) =	Volume(m ³	(3a)
	a)+(1b)+(1c)+(1d)+(1e)+(1			(4)			()	217.40	(***)
	a)1(1b)1(10)1(10)1(10)1(1	'''	77.11	J) 1 (3c)1(3c	d)+(3e)+	(3n) -		7.6
Dwelling volume				(54)1(55	71 (30) 1 (30	a)	(311) =	217.45	(5)
2. Ventilation rate:	main seconda	ry	other		total			m³ per hou	ır
Number of chimneys	heating heating bearing heating	□ + □	0	7 = F	0	x 4	0 =	0	(6a)
Number of open flues	0 + 0	_	0	」	0	x 2	0 =		(6b)
Number of intermittent fa				┙┟			0 =	0	╡`´
				Ļ	0		0 =	0	(7a)
Number of passive vents				Ļ	0			0	(7b)
Number of flueless gas f	ires				0	X 4	0 =	0	(7c)
							Air ch	anges per ho	our
Infiltration due to chimne	ys, flues and fans = (6a)+(6b)+(7a)+(7b)+	(7c) =	Γ	0		- (5) =	0	(8)
If a pressurisation test has b	peen carried out or is intended, procee	ed to (17),	otherwise o	continue fr	rom (9) to				
Number of storeys in t	he dwelling (ns)							0	(9)
Additional infiltration	.25 for steel or timber frame o	r 0 35 fo	r macani	ny coneti	ruction	[(9)-	1]x0.1 =	0	(10)
	resent, use the value corresponding t			•	uction			0	(11)
deducting areas of openi	3 /· 1	. 4. / 1	- 1\ -1				1		-
If suspended wooden to the sus	floor, enter 0.2 (unsealed) or 0	.1 (seal	ea), eise	enter U				0	(12)
•	s and doors draught stripped							0	(13)
Window infiltration	o and doors araugin empped		0.25 - [0.2	2 x (14) ÷ 1	100] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13)	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cubic metro	es per h	our per s	quare m	etre of e	envelope	area	3	(17)
•	lity value, then $(18) = [(17) \div 20] + (18)$							0.15	(18)
Air permeability value applie Number of sides sheltere	es if a pressurisation test has been do	ne or a de	gree air pe	rmeability	is being u	sed			7(40)
Shelter factor	eu		(20) = 1 -	[0.075 x (²	19)] =			0.85	(19) (20)
Infiltration rate incorpora	ting shelter factor		(21) = (18	s) x (20) =				0.13	(21)
Infiltration rate modified f	for monthly wind speed								
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Table 7								
(22)m= 5.1 5	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2	2)m <i>÷ 4</i>								
(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		
` '	1 1 1 1 1 1 1 1 1 1		1					I	

Adjusted infiltr	ation rate	(allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15		
Calculate effe		-	rate for t	he appli	cable ca	se	•		•	•			
If mechanic			andiv N. (2	2h) _ (22	a) + Emy (aguatian (I	VEVV othe	muioo (22h	n)			0.5	(23a)
If balanced with		0		, ,	,	. `	,, .	,	i) = (23a)			0.5	(23b)
		-		_					Ob.) /	00k\ f	4 (00°	74.8	(23c)
a) If balance (24a)m= 0.29		0.28	0.27	0.26	0.25	0.25	0.24	0.25	0.26	230) x [0.28] - 100]	(24a)
b) If balance	LL							1			0.20	J	(/
(24b)m= 0		0	0	0	0	0	0	0	0	0	0	1	(24b)
c) If whole h	<u> </u>	act ven	tilation o	r positiv	re input		on from	utside	<u> </u>		1	J	
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24c)
d) If natural if (22b)r	ventilation n = 1, then								0.5]		'	1	
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24d)
Effective air	change ra	ıte - er	iter (24a	or (24l	o) or (24	c) or (24	d) in bo	x (25)				-	
(25)m= 0.29	0.29	0.28	0.27	0.26	0.25	0.25	0.24	0.25	0.26	0.27	0.28		(25)
3. Heat losse	s and heat	t loss r	paramete	er:									
ELEMENT	Gross area (n	·	Openin m	gs	Net Ar A ,r		U-val W/m2		A X U (W/		k-value kJ/m²-		A X k kJ/K
Doors					2.52	X	0.91	=	2.2932	2			(26)
Windows Type	e 1				2.9	_x 1	/[1/(1.4)+	- 0.04] =	3.84				(27)
Windows Type	e 2				5.45	x1	/[1/(1.4)+	- 0.04] =	7.23	$\overline{}$			(27)
Windows Type	e 3				1.99	x1	/[1/(1.4)+	- 0.04] =	2.64				(27)
Windows Type	e 4				0.9	x1	/[1/(1.4)+	- 0.04] =	1.19				(27)
Windows Type	e 5				0.62	x1	/[1/(1.4)+	- 0.04] =	0.82				(27)
Windows Type	e 6				1.99	x1	/[1/(1.4)+	- 0.04] =	2.64				(27)
Windows Type	e 7				0.9	x1	/[1/(1.4)+	- 0.04] =	1.19				(27)
Windows Type	e 8				1.99	x1	/[1/(1.4)+	- 0.04] =	2.64				(27)
Walls Type1	76.47	\neg	22.1	5	54.32	2 x	0.14		7.6	= [(29)
Walls Type2	21.38	Ħ	0		21.38	3 x	0.17		3.62	= i		7 F	(29)
Walls Type3	7.05		0		7.05	X	0.2		1.41			= =	(29)
Roof	77.11	Ħ	0		77.1	1 X	0.1	-	7.71	=			(30)
Total area of e	L	m²			182.0	=							(31)
* for windows and ** include the are						lated using	g formula :	1/[(1/U-valı	ıe)+0.04] a	as given in	n paragrapi	n 3.2	
Fabric heat los	ss, W/K = \$	S (A x	U)				(26)(30) + (32) =				48.67	(33)
Heat capacity	Cm = S(A)	xk)						((28).	(30) + (3	2) + (32a).	(32e) =	0	(34)
Thermal mass	paramete	r (TMF	P = Cm -	- TFA) ir	n kJ/m²K			Indica	itive Value	: Medium		250	(35)
													` '

erm	ai biidde			cuiateu i	usina Ac	obenaix i	$^{\wedge}$						13.86	
	J	,	,		= 0.05 x (3	•							10.00	(3
otal fa	abric he	at loss							(33) +	(36) =			62.53	(3
entila	tion hea	it loss ca	alculated	monthly	y				(38)m	= 0.33 × (25)m x (5)			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
8)m=	20.71	20.48	20.25	19.11	18.88	17.73	17.73	17.5	18.19	18.88	19.33	19.79		(3
eat tr	ansfer o	oefficier	nt, W/K						(39)m	= (37) + (3	38)m			
9)m=	83.23	83.01	82.78	81.63	81.4	80.26	80.26	80.03	80.72	81.4	81.86	82.32		
eat Ic	ss para	meter (H	HLP), W/	m²K	_	_				Average = = (39)m ÷	Sum(39) ₁ .	12 /12=	81.58	(
))m=	1.08	1.08	1.07	1.06	1.06	1.04	1.04	1.04	1.05	1.06	1.06	1.07		
umbe	er of day	s in moi	nth (Tabl	le 1a)					,	Average =	Sum(40) ₁	12 /12=	1.06	(-
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
)m=	31	28	31	30	31	30	31	31	30	31	30	31		(
. Wa	iter heat	ing ener	gy requi	rement:								kWh/ye	ear:	
	ed occu						- 4 4 4 4 4		1012 4/	TEA 12	$\overline{}$		4	
if TF if TF	A > 13.9 A £ 13.9	9, N = 1 9, N = 1	+ 1.76 x							IFA -13.			1	
if TF if TF nnua duce	A > 13.9 A £ 13.9 I averag the annua	9, N = 1 9, N = 1 e hot wa al average	ater usag hot water	ge in litre usage by	es per da	ay Vd,av Iwelling is	erage = designed	(25 x N) to achieve	+ 36		91	.34]	(
if TF if TF inua ^{duce}	A > 13.9 A £ 13.9 I averag the annua	9, N = 1 9, N = 1 e hot wa al average	ater usag hot water	ge in litre usage by	es per da 5% if the d	ay Vd,av Iwelling is	erage = designed	(25 x N)	+ 36		91	.34]	(
if TF if TF inua duce t more	A > 13.9 A £ 13.9 I averag the annua that 125 Jan	P, N = 1 P, N = 1 P hot was Al average Stress per p Feb	ater usag hot water person per Mar	ge in litre usage by day (all w Apr	es per da 5% if the d vater use, l	ay Vd,av dwelling is hot and co	erage = designed i ld) Jul	(25 x N) to achieve	+ 36 a water us	e target o	91 f	·]	(
if TF inua duce more	A > 13.9 A £ 13.9 I averag the annua that 125 Jan	P, N = 1 P, N = 1 P hot was Al average Stress per p Feb	ater usag hot water person per Mar	ge in litre usage by day (all w Apr	es per da 5% if the d vater use, l	ay Vd,av dwelling is hot and co	erage = designed i ld) Jul	(25 x N) to achieve	+ 36 a water us	e target o	91 f	·]	(
if TF if TF inua duce t more t wate	A > 13.9 A £ 13.9 I average the annual of that 125 Jan er usage in	P, N = 1 P,	hot water person per Mar day for ea	ge in litre usage by day (all w Apr ach month	es per da 5% if the d vater use, l May Vd,m = fa 85.86	ay Vd,av Iwelling is hot and co Jun ctor from 1	erage = designed (d) Jul Table 1c x 82.2	(25 x N) to achieve Aug	+ 36 a water us Sep 89.51	Oct 93.16 Fotal = Sui	91 Nov 96.82 m(44) ₁₁₂ =	Dec 100.47	1096.04	
if TF if TF inua duce t more t wate)m=	A > 13.9 A £ 13.9 I average the annual of that 125 Jan er usage in	P, N = 1 P,	hot water person per Mar day for ea	ge in litre usage by day (all w Apr ach month 89.51	es per da 5% if the d vater use, l May Vd,m = fa 85.86	ay Vd,av Iwelling is hot and co Jun ctor from 1 82.2	erage = designed and designed a	(25 x N) to achieve Aug (43) 85.86	+ 36 a water us Sep 89.51	Oct 93.16 Fotal = Sur th (see Ta	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1	Dec 100.47 = c, 1d)	1096.04	
if TF if TF inua duce t more t wate)m=	A > 13.9 A £ 13.9 I average the annual of that 125 Jan er usage in 100.47	P, N = 1 P,	hot water person per Mar day for ea 93.16	ge in litre usage by day (all w Apr ach month	es per da 5% if the d vater use, l May Vd,m = fa 85.86	ay Vd,av Iwelling is hot and co Jun ctor from 1	erage = designed (d) Jul Table 1c x 82.2	(25 x N) to achieve Aug (43) 85.86	+ 36 a water us Sep 89.51 0 kWh/mon 104.45	Oct 93.16 Fotal = Sur th (see Ta	91 Nov 96.82 m(44) ₁₁₂ =	Dec 100.47 = c, 1d) 144.29	1096.04	
if TF if TF innua iduce it more it wate i)m= ergy (A > 13.9 A £ 13.9 I average the annual of that 125 Jan er usage in 100.47 content of 148.99	P, N = 1 P,	Mar 93.16 used - calc	ge in litre usage by day (all w Apr ach month 89.51 culated me	es per da 5% if the do ater use, l May Vd,m = fa 85.86 onthly = 4.	ay Vd,av lwelling is hot and co Jun ctor from 7 82.2 190 x Vd,r 97.07	erage = designed and ld) Jul Table 1c x 82.2 m x nm x E 89.95	(25 x N) to achieve Aug (43) 85.86	+ 36 a water us Sep 89.51 0 kWh/mon 104.45	Oct 93.16 Fotal = Sur th (see Ta	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87	Dec 100.47 = c, 1d) 144.29		
if TF if TF if TF innua duce t more t wate t wate i)m= ergy c ergy c isi)m=	A > 13.9 A £ 13.9 I average the annual of that 125 Jan er usage in 100.47 content of 148.99 taneous w 22.35	P, N = 1 P,	Mar 93.16 used - calc	ge in litre usage by day (all w Apr ach month 89.51 culated me	es per da 5% if the do ater use, l May Vd,m = fa 85.86 onthly = 4.	ay Vd,av lwelling is hot and co Jun ctor from 7 82.2 190 x Vd,r 97.07	erage = designed and designed a	(25 x N) to achieve Aug (43) 85.86 27m / 3600 103.22	+ 36 a water us Sep 89.51 0 kWh/mon 104.45	Oct 93.16 Fotal = Sur th (see Ta	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87	Dec 100.47 = c, 1d) 144.29		
if TF if TF if TF if TF innua duce t more t wate t wate i)m= nstant ater	A > 13.9 A £ 13.9 I average the annual enthal 125 Jan 100.47 content of 148.99 taneous w 22.35 storage	P, N = 1 P,	Mar day for ea 93.16 used - calc 134.47 ng at point 20.17	ge in litre usage by day (all w Apr ach month 89.51 culated mo 117.23 of use (no	es per da 5% if the day the second se	ay Vd,av lwelling is hot and co Jun ctor from 1 82.2 190 x Vd,r 97.07 r storage),	erage = designed (d) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49	(25 x N) to achieve Aug (43) 85.86 DTm / 3600 103.22 boxes (46) 15.48	+ 36 a water us Sep 89.51 0 kWh/more 104.45 0 to (61) 15.67	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	Dec 100.47 = c, 1d) 144.29 = 21.64		
if TF if TF innua duce t more t wate t wate i)m= ergy c ergy i i)m= ater orag	A > 13.9 A £ 13.9 I average the annual of that 125 Jan er usage in 100.47 content of 148.99 taneous w 22.35 storage e volum	P, N = 1 P,	Mar Mar 93.16 used - calc 134.47 ag at point 20.17	ge in litre usage by day (all w Apr ach month 89.51 culated me 117.23 of use (no	es per da 5% if the of vater use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87	ay Vd,av lwelling is hot and co Jun ctor from 1 82.2 190 x Vd,r 97.07 r storage), 14.56	erage = designed and ld) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage	(25 x N) to achieve Aug (43) 85.86 77m / 3600 103.22 boxes (46) 15.48 within sa	+ 36 a water us Sep 89.51 0 kWh/more 104.45 0 to (61) 15.67	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	Dec 100.47 = c, 1d) 144.29		
if TF if TF if TF innua duce t more t wate t wate ergy (innua inn	A > 13.9 A £ 13.9 I average the annual enthal 125 Jan 100.47 content of 148.99 taneous w 22.35 storage e volumemunity h	Pop N = 1 Pop N	Mar day for ea 93.16 134.47 includin nd no ta	ge in litre usage by day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw	es per da 5% if the d yater use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W yelling, e	ay Vd,av welling is that and co Jun ctor from 182.2 190 x Vd,r 97.07 r storage), 14.56	erage = designed (d) Jul Table 1c x 82.2 89.95 enter 0 in 13.49 storage litres in	(25 x N) to achieve Aug (43) 85.86 77m / 3600 103.22 boxes (46) 15.48 within sa	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 0 to (61) 15.67 ame vess	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	Dec 100.47 = c, 1d) 144.29 = 21.64		
if TF if TF innua duce t more t wate t wate i)m= ergy (innua ater orag committee herv	A > 13.9 A £ 13.9 I average the annual enthal 125 Jan 100.47 content of 148.99 taneous w 22.35 storage e volumemunity h	P, N = 1 P,	Mar day for ea 93.16 134.47 includin nd no ta	ge in litre usage by day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw	es per da 5% if the d yater use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W yelling, e	ay Vd,av welling is that and co Jun ctor from 182.2 190 x Vd,r 97.07 r storage), 14.56	erage = designed (d) Jul Table 1c x 82.2 89.95 enter 0 in 13.49 storage litres in	(25 x N) to achieve Aug (43) 85.86 77m / 3600 103.22 boxes (46) 15.48 within said (47)	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 0 to (61) 15.67 ame vess	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	Dec 100.47 = c, 1d) 144.29 = 21.64		
if TF if TF innua iduce it more it wate it wate is)m= instant orag commitherwater) If m	A > 13.9 A £ 13.9 I average the annual enthat 125 Jan 100.47 content of 148.99 taneous w 22.35 storage e volum munity h vise if no storage hanufact	P, N = 1 P,	Mar Mar 93.16 used - calc 134.47 including and no talchot water eclared le	Apr Apr Ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw er (this in	es per da 5% if the d yater use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W yelling, e	ay Vd,av lwelling is hot and co Jun ctor from 82.2 190 x Vd,r 97.07 r storage), 14.56 /WHRS nter 110 nstantar	erage = designed (d) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage 0 litres in neous co	(25 x N) to achieve Aug (43) 85.86 77m / 3600 103.22 boxes (46) 15.48 within said (47)	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 0 to (61) 15.67 ame vess	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	Dec 100.47 = c, 1d) 144.29 = 21.64		
if TF if TF if TF innua iduce it more it wate	A > 13.9 A £ 13.9 I average the annual enthat 125 Jan 100.47 100.47 content of 148.99 taneous w 22.35 storage e volum munity h vise if no storage hanufact erature fa	Poly N = 1	Mar day for ear 93.16 134.47 including and no tale hot water or table are directly and ta	ge in litre usage by day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw er (this in oss facto 2b	es per da 5% if the d yater use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W yelling, e ncludes i	ay Vd,av lwelling is hot and co Jun ctor from 82.2 190 x Vd,r 97.07 r storage), 14.56 /WHRS nter 110 nstantar	erage = designed (d) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage 0 litres in neous co	(25 x N) to achieve Aug (43) 85.86 77m / 3600 103.22 boxes (46) 15.48 within said (47)	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 0 to (61) 15.67 ame vess	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	Dec 100.47 = c, 1d) 144.29 = 21.64		
if TF if TF innua iduce it more it wate it wate it wate is)m= aster orag commiser ater old fine ater orag commiser ater orag ater ater orag ater ater orag ater	A > 13.9 A £ 13.9 I average the annual enthal 125 Jan 100.47 100.47 content of 148.99 storage e volum munity he vise if no storage enanufact enanufact enature for the content of the cont	P, N = 1 P,	Mar	Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw er (this in oss facto 2b , kWh/ye	es per da 5% if the of water use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or Water velling, encludes i or is known	ay Vd,av liwelling is hot and co Jun ctor from 1 82.2 190 x Vd,r 97.07 r storage), 14.56 /WHRS enter 110 nstantar wn (kWh	erage = designed (d) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage 0 litres in neous con/day):	(25 x N) to achieve Aug (43) 85.86 77m / 3600 103.22 boxes (46) 15.48 within said (47)	+ 36 a water us Sep 89.51 0 kWh/more 104.45 15.67 ame vess ers) ente	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) 112 = ables 1b, 1 132.87 m(45) 112 =	Dec 100.47 = c, 1d) 144.29 = 21.64		
if TF if TF innua iduce it more it water is in the stand	A > 13.9 A £ 13.9 I average the annual enthal 125 Jan Per usage in 100.47 100.47 content of 148.99 taneous w 22.35 storage e volume munity he wise if no storage in anufact entature fair to the anufact enter storage in anufact enter storage e	P, N = 1 P,	Mar	ge in litre usage by day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw er (this in oss facto 2b , kWh/ye cylinder l com Tabl	es per da 5% if the d yater use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W yelling, e ncludes i	ay Vd,av liwelling is hot and co Jun ctor from 82.2 190 x Vd,r 97.07 r storage), 14.56 /WHRS enter 110 nstantar wn (kWh	erage = designed id) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage 0 litres in neous con/day): known:	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22 boxes (46) 15.48 within sa (47) ombi boil	+ 36 a water us Sep 89.51 0 kWh/more 104.45 15.67 ame vess ers) ente	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	Dec 100.47 = c, 1d) 144.29 = 21.64 0		
if TF if TF innua iduce it more it wate it wat	A > 13.9 A £ 13.9 I average the annual enthat 125 Jan 100.47 100.47 content of 148.99 taneous w 22.35 storage e volum munity he wise if no storage e anufact entaure far anufact entaure far anufact enter storage munity he wise if no storage entaure far anufact enter storage entaure far anufact entau	P, N = 1 P,	Mar day for ea 93.16 134.47 including at point and no tale to take eclared less storage eclared of factor free sections.	ge in litre usage by day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so ank in dw er (this in oss facto 2b , kWh/ye cylinder l com Tabl	es per da 5% if the of water use, I May Vd,m = fa 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W welling, e ncludes i or is kno ear loss fact	ay Vd,av liwelling is hot and co Jun ctor from 82.2 190 x Vd,r 97.07 r storage), 14.56 /WHRS enter 110 nstantar wn (kWh	erage = designed id) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage 0 litres in neous con/day): known:	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22 boxes (46) 15.48 within sa (47) ombi boil	+ 36 a water us Sep 89.51 0 kWh/more 104.45 15.67 ame vess ers) ente	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur 18.26	91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	Dec 100.47 = c, 1d) 144.29 = 21.64 0 0 0 10		

Energy lost from water storage, kWh/year	(47) x (51) x (52) x (53) =	1.0	03	(.	(54)
Enter (50) or (54) in (55)		1.0)3	((55)
Water storage loss calculated for each month	$((56)m = (55) \times (41)m$				
(56)m= 32.01 28.92 32.01 30.98 32.01 30.98 32.01	32.01 30.98 32.0	01 30.98	32.01	((56)
If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷	50), else (57)m = (56)m who	ere (H11) is fron	n Appendix	кH	
(57)m= 32.01 28.92 32.01 30.98 32.01 30.98 32.01	32.01 30.98 32.0	01 30.98	32.01	((57)
Primary circuit loss (annual) from Table 3		0)	((58)
Primary circuit loss calculated for each month (59) m = $(58) \div (59)$ m	365 × (41)m				
(modified by factor from Table H5 if there is solar water hea	ting and a cylinder ther	rmostat)			
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26	23.26 22.51 23.2	26 22.51	23.26	((59)
Combi loss calculated for each month (61)m = (60) \div 365 × (4	1)m				
(61)m= 0 0 0 0 0 0	0 0 0	0	0	((61)
Total heat required for water heating calculated for each month	$h (62)m = 0.85 \times (45)m$	n + (46)m + ((57)m + ((59)m + (61)m	
(62)m= 204.27 180.24 189.75 170.73 167.77 150.56 145.23	158.49 157.94 17	7 186.37	199.57	((62)
Solar DHW input calculated using Appendix G or Appendix H (negative quan	ity) (enter '0' if no solar contr	ribution to water	r heating)		
(add additional lines if FGHRS and/or WWHRS applies, see A	ppendix G)				
(63)m= 0 0 0 0 0 0	0 0 0	0	0	((63)
Output from water heater					
(64)m= 204.27 180.24 189.75 170.73 167.77 150.56 145.23	158.49 157.94 17	7 186.37	199.57		
	Output from water he	eater (annual) ₁	.12	2087.92	(64)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)	m + (61)m] + 0.8 x [(46	6)m + (57)m -	+ (59)m]	1	
(65)m= 93.76 83.27 88.93 81.78 81.62 75.07 74.13	78.54 77.52 84.	.7 86.98	92.2	((65)
(65)m= 93.76 83.27 88.93 81.78 81.62 75.07 74.13 include (57)m in calculation of (65)m only if cylinder is in the	-			`	(65)
	-			`	(65)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a):	-			`	(65)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	dwelling or hot water			`	(65)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	dwelling or hot water	is from comm	munity he	eating	(65)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34	Aug Sep O	is from comm	nunity he	eating	
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	Aug Sep O	is from common lock Nov34 144.34	nunity he	eating	
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 14	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.2	is from common c	Dec	eating	(66)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.2 13a), also see Table 5	is from commodet Nov .34 144.34 27 45.83	Dec	eating ((66)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 14	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260.	is from commodet Nov .34 144.34 27 45.83	Dec 144.34	eating ((66)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.37 14	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260.	is from common ct Nov .34 144.34 27 45.83	Dec 144.34	eating ((66)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.37 14	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.2 13a), also see Table 5 234.86 243.18 260. a), also see Table 5	is from common ct Nov .34 144.34 27 45.83	Dec 144.34 48.86 304.3	eating ((66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.37 14	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8	is from comment of the Nov .34	Dec 144.34 48.86 304.3	eating ((66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.2 13a), also see Table 5 234.86 243.18 260. a), also see Table 5	is from comment of the Nov .34	Dec 144.34 48.86 304.3	eating ((66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 16.41 17.73 Appliances gains (calculated in Appendix L, equation L13 or L (68)m= 318.35 321.65 313.33 295.61 273.24 252.21 238.16 Cooking gains (calculated in Appendix L, equation L15 or L15 (69)m= 51.84 5	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8 0 0 0 0	is from common c	Dec 144.34 48.86 304.3	eating ((66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 167)m= 47.54 42.22 34.34 26 19.43 16.41 17.73 Appliances gains (calculated in Appendix L, equation L13 or L (68)m= 318.35 321.65 313.33 295.61 273.24 252.21 238.10 Cooking gains (calculated in Appendix L, equation L15 or L15 (69)m= 51.84	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8 0 0 0 0	is from common c	Dec 144.34 48.86 304.3	eating ((66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 16.41 17.73 Lighting gains (calculated in Appendix L, equation L9 or L9a), (67)m= 47.54 42.22 34.34 26 19.43 16.41 17.73 Appliances gains (calculated in Appendix L, equation L13 or L (68)m= 318.35 321.65 313.33 295.61 273.24 252.21 238.16 Cooking gains (calculated in Appendix L, equation L15 or L15 (69)m= 51.84	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8 0 0 0 0 -96.23 -96.23 -96.	is from common c	Dec 144.34 48.86 304.3 51.84 0	eating	(66) (67) (68) (70)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 16.41 17.73 Appliances gains (calculated in Appendix L, equation L13 or L (68)m= 318.35 321.65 313.33 295.61 273.24 252.21 238.16 Cooking gains (calculated in Appendix L, equation L15 or L15 (69)m= 51.84 51	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8 0 0 0 0 -96.23 -96.23 -96.	is from common variable. Nov .34 144.34 27 45.83 .91 283.28 84 51.84 0 0 .23 -96.23 .84 120.8	Dec 144.34 48.86 304.3 51.84 0 -96.23	eating	(66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 16.41 17.73 Appliances gains (calculated in Appendix L, equation L13 or L (68)m= 318.35 321.65 313.33 295.61 273.24 252.21 238.14 Cooking gains (calculated in Appendix L, equation L15 or L15 (69)m= 51.84 5	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8 0 0 0 -96.23 -96.23 -96. 105.57 107.67 113. m + (68)m + (69)m + (70)m	is from community in the community of th	Dec 144.34 48.86 304.3 51.84 0 -96.23 123.92 m	eating	(66) (67) (68) (70) (71)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 16.41 17.73 Appliances gains (calculated in Appendix L, equation L13 or L (68)m= 318.35 321.65 313.33 295.61 273.24 252.21 238.16 Cooking gains (calculated in Appendix L, equation L15 or L15 (69)m= 51.84 51	Aug Sep O 144.34 144.34 144. also see Table 5 23.04 30.93 39.3 13a), also see Table 5 234.86 243.18 260. a), also see Table 5 51.84 51.84 51.8 0 0 0 -96.23 -96.23 -96. 105.57 107.67 113. m + (68)m + (69)m + (70)m	is from community in the community of th	Dec 144.34 48.86 304.3 51.84 0 -96.23	eating	(66) (67) (68) (70)

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

Orientation: Access Factor Table 6d	r	Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast _{0.9x} 0.77	x	1.99	x	11.28	x	0.4	x	0.8] =	4.98	(75)
Northeast _{0.9x} 0.77	x	1.99	x	22.97	x	0.4	X	0.8	=	10.14	(75)
Northeast 0.9x 0.77	x	1.99	x	41.38	x	0.4	x	0.8	=	18.26	(75)
Northeast _{0.9x} 0.77	x	1.99	x	67.96	x	0.4	x	0.8	=	29.99	(75)
Northeast _{0.9x} 0.77	x	1.99	x	91.35	x	0.4	X	0.8	=	40.31	(75)
Northeast 0.9x 0.77	x	1.99	x	97.38	x	0.4	x	0.8	=	42.98	(75)
Northeast _{0.9x} 0.77	x	1.99	x	91.1	x	0.4	x	0.8	=	40.2	(75)
Northeast _{0.9x} 0.77	x	1.99	x	72.63	x	0.4	x	0.8	=	32.05	(75)
Northeast _{0.9x} 0.77	x	1.99	x	50.42	x	0.4	x	0.8	=	22.25	(75)
Northeast _{0.9x} 0.77	x	1.99	x	28.07	x	0.4	x	0.8	=	12.39	(75)
Northeast _{0.9x} 0.77	x	1.99	x	14.2	x	0.4	x	0.8	=	6.27	(75)
Northeast _{0.9x} 0.77	x	1.99	x	9.21	x	0.4	x	0.8	=	4.07	(75)
Southeast 0.9x 0.77	x	2.9	x	36.79	x	0.4	x	0.8	=	23.66	(77)
Southeast 0.9x 0.77	x	5.45	x	36.79	x	0.4	x	0.8	=	44.47	(77)
Southeast 0.9x 0.77	x	2.9	x	62.67	x	0.4	x	0.8	=	40.31	(77)
Southeast 0.9x 0.77	x	5.45	x	62.67	x	0.4	X	0.8	=	75.75	(77)
Southeast 0.9x 0.77	x	2.9	x	85.75	x	0.4	x	0.8	=	55.15	(77)
Southeast 0.9x 0.77	x	5.45	x	85.75	x	0.4	x	0.8	=	103.64	(77)
Southeast 0.9x 0.77	x	2.9	x	106.25	x	0.4	X	0.8	=	68.33	(77)
Southeast 0.9x 0.77	x	5.45	x	106.25	x	0.4	x	0.8	=	128.41	(77)
Southeast 0.9x 0.77	x	2.9	x	119.01	x	0.4	x	0.8	=	76.54	(77)
Southeast 0.9x 0.77	x	5.45	x	119.01	x	0.4	X	0.8	=	143.84	(77)
Southeast 0.9x 0.77	x	2.9	x	118.15	x	0.4	X	0.8	=	75.98	(77)
Southeast 0.9x 0.77	x	5.45	x	118.15	x	0.4	x	0.8	=	142.8	(77)
Southeast 0.9x 0.77	x	2.9	x	113.91	x	0.4	x	0.8	=	73.26	(77)
Southeast 0.9x 0.77	x	5.45	x	113.91	x	0.4	x	0.8	=	137.67	(77)
Southeast 0.9x 0.77	x	2.9	x	104.39	x	0.4	x	0.8	=	67.13	(77)
Southeast 0.9x 0.77	x	5.45	x	104.39	x	0.4	x	0.8	=	126.17	(77)
Southeast 0.9x 0.77	x	2.9	x	92.85	x	0.4	x	0.8	=	59.71	(77)
Southeast 0.9x 0.77	x	5.45	x	92.85	x	0.4	x	0.8	=	112.22	(77)
Southeast 0.9x 0.77	x	2.9	x	69.27	x	0.4	x	0.8	=	44.55	(77)
Southeast 0.9x 0.77	x	5.45	x	69.27	x	0.4	x	0.8	=	83.72	(77)
Southeast 0.9x 0.77	x	2.9	x	44.07	x	0.4	x	0.8	=	28.34	(77)
Southeast 0.9x 0.77	x	5.45	x	44.07	x	0.4	x	0.8	=	53.26	(77)
Southeast 0.9x 0.77	x	2.9	x	31.49	x	0.4	x	0.8	=	20.25	(77)
Southeast 0.9x 0.77	X	5.45	x	31.49	x	0.4	x	0.8	=	38.06	(77)
Southwest _{0.9x} 0.77	X	1.99	x	36.79]	0.4	x	0.8] =	16.24	(79)
Southwest _{0.9x} 0.77	X	0.9	x	36.79]	0.4	x	0.8	=	14.69	(79)
Southwest _{0.9x} 0.77	X	1.99	x	62.67]	0.4	X	0.8	=	27.66	(79)

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Southwest _{0.9x}	0.77	X	0.9	X	62.67	<u> </u>	0.4	X	0.8] =	25.02	(79)
Southwest _{0.9x}	0.77	X	1.99	X	85.75	ļ	0.4	X	0.8	=	37.84	(79)
Southwest _{0.9x}	0.77	X	0.9	X	85.75	_	0.4	X	0.8	=	34.23	(79)
Southwest _{0.9x}	0.77	X	1.99	X	106.25	ļ	0.4	X	0.8	=	46.89	(79)
Southwest _{0.9x}	0.77	X	0.9	X	106.25	[0.4	X	0.8	=	42.41	(79)
Southwest _{0.9x}	0.77	X	1.99	X	119.01	<u> </u>	0.4	X	0.8	=	52.52	(79)
Southwest _{0.9x}	0.77	X	0.9	X	119.01	<u> </u>	0.4	X	0.8	=	47.51	(79)
Southwest _{0.9x}	0.77	X	1.99	X	118.15]	0.4	X	0.8	=	52.14	(79)
Southwest _{0.9x}	0.77	X	0.9	X	118.15		0.4	X	0.8	=	47.16	(79)
Southwest _{0.9x}	0.77	X	1.99	X	113.91]	0.4	X	0.8	=	50.27	(79)
Southwest _{0.9x}	0.77	X	0.9	X	113.91		0.4	X	0.8	=	45.47	(79)
Southwest _{0.9x}	0.77	X	1.99	X	104.39]	0.4	x	0.8	=	46.07	(79)
Southwest _{0.9x}	0.77	X	0.9	X	104.39		0.4	X	0.8	=	41.67	(79)
Southwest _{0.9x}	0.77	X	1.99	X	92.85]	0.4	X	0.8	=	40.98	(79)
Southwest _{0.9x}	0.77	X	0.9	X	92.85]	0.4	X	0.8	=	37.06	(79)
Southwest _{0.9x}	0.77	X	1.99	x	69.27]	0.4	X	0.8	=	30.57	(79)
Southwest _{0.9x}	0.77	X	0.9	X	69.27]	0.4	x	0.8	=	27.65	(79)
Southwest _{0.9x}	0.77	X	1.99	X	44.07]	0.4	x	0.8	=	19.45	(79)
Southwest _{0.9x}	0.77	X	0.9	x	44.07]	0.4	x	0.8	=	17.59	(79)
Southwest _{0.9x}	0.77	X	1.99	x	31.49]	0.4	X	0.8	=	13.9	(79)
Southwest _{0.9x}	0.77	X	0.9	X	31.49]	0.4	x	0.8	=	12.57	(79)
Northwest _{0.9x}	0.77	X	1.99	x	11.28	x	0.4	x	0.8	=	9.96	(81)
Northwest _{0.9x}	0.77	X	0.9	X	11.28	X	0.4	X	0.8] =	2.25	(81)
Northwest _{0.9x}	0.77	X	0.62	x	11.28	x	0.4	X	0.8	=	1.55	(81)
Northwest _{0.9x}	0.77	X	1.99	x	22.97	x	0.4	X	0.8	=	20.27	(81)
Northwest _{0.9x}	0.77	X	0.9	x	22.97	X	0.4	X	0.8	=	4.58	(81)
Northwest _{0.9x}	0.77	X	0.62	x	22.97	x	0.4	x	0.8	=	3.16	(81)
Northwest _{0.9x}	0.77	X	1.99	x	41.38	x	0.4	X	0.8	=	36.52	(81)
Northwest _{0.9x}	0.77	X	0.9	x	41.38	X	0.4	X	0.8	=	8.26	(81)
Northwest 0.9x	0.77	X	0.62	x	41.38	x	0.4	x	0.8	=	5.69	(81)
Northwest _{0.9x}	0.77	X	1.99	x	67.96	x	0.4	x	0.8	=	59.98	(81)
Northwest _{0.9x}	0.77	X	0.9	x	67.96	x	0.4	x	0.8	=	13.56	(81)
Northwest 0.9x	0.77	X	0.62	x	67.96	x	0.4	х	0.8	=	9.34	(81)
Northwest _{0.9x}	0.77	X	1.99	x	91.35	x	0.4	x	0.8	=	80.62	(81)
Northwest _{0.9x}	0.77	X	0.9	x	91.35	x	0.4	x	0.8	=	18.23	(81)
Northwest _{0.9x}	0.77	x	0.62	x	91.35	x	0.4	x	0.8] =	12.56	(81)
Northwest _{0.9x}	0.77	x	1.99	x	97.38	x	0.4	x	0.8] =	85.95	(81)
Northwest _{0.9x}	0.77	x	0.9	x	97.38	x	0.4	x	0.8	=	19.44	(81)
Northwest _{0.9x}	0.77	x	0.62	x	97.38	x	0.4	x	0.8	=	13.39	(81)
Northwest _{0.9x}	0.77	x	1.99	x	91.1	x	0.4	x	0.8] =	80.41	(81)
Northwest _{0.9x}	0.77	x	0.9	x	91.1	x	0.4	x	0.8	=	18.18	(81)
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Northwest _{0.9x}	0.77	X	0.6	52	X		91.1	X	0.4	×	0.8	=	12.53	(81)
Northwest 0.9x	0.77	X	1.9	99	X	7	2.63	X	0.4	X	0.8	=	64.1	(81)
Northwest 0.9x	0.77	X	0.	9	X	7	2.63	X	0.4	X	0.8	=	14.5	(81)
Northwest 0.9x	0.77	X	0.6	52	X	7	2.63	X	0.4	X	0.8	=	9.99	(81)
Northwest 0.9x	0.77	X	1.9	99	X	5	0.42	X	0.4	x	0.8	=	44.5	(81)
Northwest 0.9x	0.77	X	0.	9	X	5	0.42	X	0.4	x	0.8		10.06	(81)
Northwest 0.9x	0.77	x	0.6	52	X	5	0.42	x	0.4	x	0.8	=	6.93	(81)
Northwest 0.9x	0.77	x	1.9	99	X	2	8.07	x	0.4	x	0.8	=	24.77	(81)
Northwest 0.9x	0.77	х	0.	9	X	2	8.07	x	0.4	x	0.8	=	5.6	(81)
Northwest 0.9x	0.77	x	0.6	52	X	2	8.07	x	0.4	x	0.8	=	3.86	(81)
Northwest 0.9x	0.77	x	1.9	99	X	_	14.2	x	0.4	x	0.8	=	12.53	(81)
Northwest 0.9x	0.77	х	0.	9	X	,	14.2	x	0.4	x	0.8	=	2.83	(81)
Northwest 0.9x	0.77	x	0.6	52	X	_	14.2	x	0.4	×	0.8	=	1.95	(81)
Northwest 0.9x	0.77	x	1.9	99	X	9	9.21	x	0.4	x	0.8	=	8.13	(81)
Northwest 0.9x	0.77	x	0.	9	X	9	9.21	x	0.4	x	0.8	=	1.84	(81)
Northwest 0.9x	0.77	x	0.6	52	X	9	9.21	x	0.4	x	0.8	=	1.27	(81)
_														
Solar gains in	watts, cal	culated	for eac	h month	า			(83)m	n = Sum(74)m .	(82)m	1			
(83)m= 117.8	206.87	299.59	398.92	472.12	4	79.83	457.98	401	.67 333.72	233.	1 142.23	100.08]	(83)
Total gains – i	nternal an	nd solar	(84)m =	= (73)m	+ (8	83)m	, watts		•	•	•	•	_	
(84)m= 709.66	794.62	866.74	934.06	974.45	9	52.67	913.46	865	.09 815.46	747.0	7 692.09	677.12]	(84)
	1.4													
7. Mean inter	nal tempe	erature ((heating	seasor	n)									
7. Mean inter Temperature		`				area f	from Tal	ole 9	, Th1 (°C)				21	(85)
	during he	eating pe	eriods ir	n the liv	ing			ole 9	, Th1 (°C)				21	(85)
Temperature	during he	eating pe	eriods ir	n the liv	ing n (s				, Th1 (°C)	Ос	t Nov	Dec	21	(85)
Temperature Utilisation fac	during he	eating pe	eriods ir	n the liv	ing n (s	ee Ta	ble 9a)		ug Sep	Oc 0.89		Dec 0.99	21	(85)
Temperature Utilisation fac Jan (86)m= 0.99	during he stor for gai Feb	eating period ins for li Mar 0.94	eriods ir ving are Apr 0.87	n the livea, h1,n May	ing n (s	ee Ta Jun ^{0.53}	Jul 0.39	A 0.4	ug Sep 12 0.65	 	_		21	
Temperature Utilisation fac	during he stor for gai Feb	eating period ins for li Mar 0.94	eriods ir ving are Apr 0.87	n the livea, h1,n May	ing n (s	ee Ta Jun ^{0.53}	Jul 0.39	A 0.4	ug Sep 12 0.65 able 9c)	 	0.97		21	
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15	during he stor for gaing Feb 0.97 I temperate 20.3	eating period ins for lims for	eriods ir iving are Apr 0.87 iving are 20.78	n the livea, h1,n May 0.72 ea T1 (f	ing n (s l follo	ee Ta Jun 0.53 ow ste	Jul 0.39 ps 3 to 7	7 in T	ug Sep 12 0.65 Table 9c) 1 20.97	0.89	0.97	0.99	21	(86)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature	during he tor for gaing Feb 0.97 I temperate 20.3 during he	eating period ins for line Mar 0.94 ture in line 20.53 eating period in line 20.53	eriods ir iving are Apr 0.87 iving are 20.78 eriods ir	n the livea, h1,n May 0.72 ea T1 (f 20.93	ing n (s follo	ee Ta Jun 0.53 ow ste 20.99	ble 9a) Jul 0.39 ps 3 to 7 21 from Ta	A 0.47 in T 2 able 9	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C)	20.78	0.97	0.99	21	(86)
Temperature Utilisation fact Jan (86)m= 0.99 Mean internat (87)m= 20.15 Temperature (88)m= 20.02	during he tor for gained Feb 0.97 l temperate 20.3 during he 20.02	eating period ins for line Mar 0.94 ture in line 20.53 eating period 20.02	Apr 0.87 iving are 20.78 eriods ir 20.03	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04	ing (s) (s) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	Jun 0.53 ow ste 20.99 velling 20.05	Jul 0.39 ps 3 to 7 21 from Ta 20.05	A 0.47 in T 2 able 9 20.	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C)	0.89	0.97	0.99	21	(86)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors	during he ctor for gaine Feb 0.97 I temperate 20.3 during he 20.02	eating period ins for line at line in line 20.53 eating period 20.02 ins for residue in line at line a	eriods in ving are 0.87 iving are 20.78 eriods in 20.03 est of d	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling,	ing (s)	ee Ta Jun 0.53 ow ste 20.99 velling 20.05 ,m (se	Jul 0.39 ps 3 to 7 21 from Ta 20.05	A 0.47 in T 2 able 9 20.	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04	20.78	0.97 3 20.42 4 20.03	20.12	21	(86) (87) (88)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98	during he ctor for gainer for gai	eating period ins for line at line in line 20.53 eating period 20.02 ins for recognition in line in line 20.02 eating period 20.02 ins for recognition in line	eriods in ving are 0.87 ving are 20.78 eriods in 20.03 est of di 0.83	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66	ing (s)	ee Ta Jun 0.53 ow ste 20.99 velling 20.05 om (se 0.46	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3	A 0.47 in T 2 able 9 20.	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04	20.78 20.04	0.97 3 20.42 4 20.03	0.99	21	(86)
Temperature Utilisation factors Jan (86)m= 0.99 Mean internation (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98 Mean internation	during he tor for gained properties of the second properties of the sec	eating period ins for line and	eriods in Apr 0.87 iving are 20.78 eriods in 20.03 est of do 0.83 he rest	m the lives, h1,n May 0.72 ea T1 (for 20.93 en rest of 20.04 elling, 0.66 of dwelling	ing (see) (see	ee Ta Jun 0.53 w ste 20.99 velling 20.05 m (se 0.46 T2 (fo	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3 ollow ste	A 0.27 in T 2 able 9 20. 9a) 0.3	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 1 0.57 1 to 7 in Table	0.89 20.78 20.04 0.85 e 9c)	0.97 3 20.42 4 20.03 0.96	20.12 20.03 0.99		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98	during he ctor for gainer for gai	eating period ins for line at line in line 20.53 eating period 20.02 ins for recognition in line in line 20.02 eating period 20.02 ins for recognition in line	eriods in ving are 0.87 ving are 20.78 eriods in 20.03 est of di 0.83	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66	ing (see) (see	ee Ta Jun 0.53 ow ste 20.99 velling 20.05 om (se 0.46	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3	A 0.47 in T 2 able 9 20.	ug Sep 42 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 4 0.57 4 to 7 in Table 05 20.02	0.89 20.78 20.04 0.85 le 9c) 19.8	0.97 3 20.42 4 20.03 0.96	0.99 20.12 20.03 0.99		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 0.99 Mean internation (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98 Mean internation	during he tor for gained properties of the second properties of the sec	eating period ins for line and	eriods in Apr 0.87 iving are 20.78 eriods in 20.03 est of do 0.83 he rest	m the lives, h1,n May 0.72 ea T1 (for 20.93 en rest of 20.04 elling, 0.66 of dwelling	ing (see) (see	ee Ta Jun 0.53 w ste 20.99 velling 20.05 m (se 0.46 T2 (fo	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3 ollow ste	A 0.27 in T 2 able 9 20. 9a) 0.3	ug Sep 42 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 4 0.57 4 to 7 in Table 05 20.02	0.89 20.78 20.04 0.85 le 9c) 19.8	0.97 3 20.42 4 20.03 0.96	0.99 20.12 20.03 0.99	21	(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98 Mean interna	during he ctor for gainer for gai	eating period ins for II 20.53 eating period ins for reconstant to 19.45	eriods in ving are 0.87 iving are 20.78 eriods in 20.03 est of di 0.83 he rest 19.79	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66 of dwel 19.98	n (s	ee Ta Jun 0.53 w ste 20.99 velling 20.05 m (se 0.46 T2 (fo	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3 collow ste	A 0.4 7 in 1 2 20. 9a) 0.3 eps 3	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 1 0.57 1 to 7 in Table 1 20.02	0.89 20.78 20.04 0.85 le 9c) 19.8	0.97 3 20.42 4 20.03 0.96	0.99 20.12 20.03 0.99		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98 Mean interna (90)m= 18.91	during he ctor for gainer for gai	eating period ins for II 20.53 eating period ins for reconstant to 19.45	eriods in ving are 0.87 iving are 20.78 eriods in 20.03 est of di 0.83 he rest 19.79	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66 of dwel 19.98	follo follo follo follo g h2, u elling	ee Ta Jun 0.53 w ste 20.99 velling 20.05 m (se 0.46 T2 (fo	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3 collow ste	A 0.4 7 in 1 2 20. 9a) 0.3 eps 3	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 14 0.57 15 to 7 in Table 15 20.02 - fLA) × T2	0.89 20.78 20.04 0.85 le 9c) 19.8	0.97 3 20.42 4 20.03 0.96 19.32 ving area ÷ (-	0.99 20.12 20.03 0.99		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation factors (89)m= 0.98 Mean interna (90)m= 18.91 Mean interna (92)m= 19.35 Apply adjustr	during he stor for gainer for gai	eating period ins for II 20.53 eating period ins for reconstant to 19.45 ture (for 19.84	eriods in ving are Apr 0.87 iving are 20.78 eriods in 20.03 est of di 0.83 he rest 19.79 r the wheeling are 20.15	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66 of dwel 19.98 eole dwe 20.32	ing n (s follo 2 h2, h2, colored billing 2	ee Ta Jun 0.53 ow ste 20.99 velling 20.05 m (se 0.46 T2 (fo 20.04 g) = fl 20.38	Jul 0.39 ps 3 to 7 21 from Ta 20.05 pe Table 0.3 collow ste 20.05 LA × T1 20.39	A A 0.47 in 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ug Sep 42 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 4 0.57 to 7 in Table 05 20.02 - fLA) × T2 39 20.36	0.89 20.78 20.04 0.85 le 9c) 19.8 fLA = Li 20.15	0.97 3 20.42 4 20.03 0.96 19.32 ving area ÷ (-	0.99 20.12 20.03 0.99 18.88 4) =		(86) (87) (88) (89) (90) (91) (92)
Temperature Utilisation fact Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.98 Mean interna (90)m= 18.91 Mean interna (92)m= 19.35 Apply adjustr (93)m= 19.35	during he stor for gainer for gai	eating periods in seriods for real serio	eriods in ving are Apr 0.87 iving are 20.78 eriods in 20.03 est of di 0.83 he rest 19.79 r the wheeling are 20.15	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66 of dwel 19.98 eole dwe 20.32	ing n (s follo 2 h2, (s h2, (s pollo color color	ee Ta Jun 0.53 ow ste 20.99 velling 20.05 m (se 0.46 T2 (fo 20.04 g) = fl 20.38	Jul 0.39 ps 3 to 7 21 from Ta 20.05 pe Table 0.3 collow ste 20.05 LA × T1 20.39	A A 0.47 in 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ug Sep 12 0.65 Table 9c) 1 20.97 9, Th2 (°C) 05 20.04 34 0.57 1 to 7 in Table 05 20.02 — fLA) × T2 39 20.36 where appre	0.89 20.78 20.04 0.85 le 9c) 19.8 fLA = Li 20.15	0.97 3 20.42 4 20.03 0.96 19.32 ving area ÷ (0.99 20.12 20.03 0.99 18.88 4) =		(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 0.99 Mean internation (87)m= 20.15 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.98 Mean internation (90)m= 18.91 Mean internation (92)m= 19.35 Apply adjustr (93)m= 19.35 8. Space hear	during heretor for gainer for gai	eating periods for line for received the second sec	eriods in ving are Apr 0.87 iving are 20.78 eriods in 20.03 est of do 0.83 he rest 19.79 r the who 20.15 internal 20.15	n the livea, h1,n May 0.72 ea T1 (f 20.93 n rest of 20.04 welling, 0.66 of dwel 19.98 nole dwe 20.32 tempe 20.32	ing n (s follo 2 h2, h2, c lling 2 ratu 2	ee Ta Jun 0.53 w ste 20.99 velling 20.05 m (se 0.46 T2 (fo 20.04 g) = fl 20.38 ure fro 20.38	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3 ollow ste 20.05 LA × T1 20.39 m Table 20.39	9a) 0.3 eps 3 20. + (1 20. 24e, 20.	ug Sep 42 0.65 able 9c) 1 20.97 9, Th2 (°C) 05 20.04 4 0.57 4 to 7 in Table 05 20.02 - fLA) × T2 39 20.36 where appre	0.89 20.76 20.04 0.85 le 9c) 19.8 fLA = Li copriate 20.19	0.97 3 20.42 4 20.03 4 0.96 19.32 ving area ÷ (4) 5 19.71	0.99 20.12 20.03 0.99 18.88 4) =	0.36	(86) (87) (88) (89) (90) (91) (92)
Temperature Utilisation fact Jan (86)m= 0.99 Mean interna (87)m= 20.15 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.98 Mean interna (90)m= 18.91 Mean interna (92)m= 19.35 Apply adjustr (93)m= 19.35	during he stor for gainer for gai	eating periods for line for received the second sec	eriods in ving are Apr 0.87 iving are 20.78 eriods in 20.03 est of d 0.83 he rest 19.79 r the wh 20.15 internal 20.15	n the lives, h1,n May 0.72 ea T1 (for 20.93 in rest of 20.04 welling, 0.66 of dweld 19.98 in ole dweld 20.32 itempe 20.32	ing n (s follo 2 h2, h2, c lling 2 ratu 2	ee Ta Jun 0.53 w ste 20.99 velling 20.05 m (se 0.46 T2 (fo 20.04 g) = fl 20.38 ure fro 20.38	Jul 0.39 ps 3 to 7 21 from Ta 20.05 ee Table 0.3 ollow ste 20.05 LA × T1 20.39 m Table 20.39	9a) 0.3 eps 3 20. + (1 20. 24e, 20.	ug Sep 42 0.65 able 9c) 1 20.97 9, Th2 (°C) 05 20.04 4 0.57 4 to 7 in Table 05 20.02 - fLA) × T2 39 20.36 where appre	0.89 20.76 20.04 0.85 le 9c) 19.8 fLA = Li copriate 20.19	0.97 3 20.42 4 20.03 4 0.96 19.32 ving area ÷ (4) 5 19.71	0.99 20.12 20.03 0.99 18.88 4) =	0.36	(86) (87) (88) (89) (90) (91) (92)

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Mar

Jan

Feb

Utilisation factor for gains, hm:	0.07	0.0	0.00	0.00			(94)
(94)m= 0.98 0.96 0.92 0.84 0.68 0.48 0.33 Useful gains, hmGm , W = (94)m x (84)m	0.37	0.6	0.86	0.96	0.98		(94)
	318.38 4	490.36	642.24	663.1	664.87		(95)
Monthly average external temperature from Table 8	<u> </u>	<u>I</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 [α	[(93)m- ((96)m]					
		505.42	777.4	1032.63	1244.62		(97)
Space heating requirement for each month, kWh/month = 0.024					104.00		
(98)m= 415.88 304.26 225.43 98.96 28.41 0 0	O Total no	0	100.56	266.06	431.33	4070.00	(98)
O	rotai pe	er year (kvvn/year) = Sum(9	8)15,912 =	1870.88	=
Space heating requirement in kWh/m²/year						24.26	(99)
9b. Energy requirements – Community heating scheme							
This part is used for space heating, space cooling or water heating Fraction of space heat from secondary/supplementary heating (Ta				unity sch	neme. 	0	(301)
Fraction of space heat from community system $1 - (301) =$	ubio 11)	0 11 110			[1	(302)
The community scheme may obtain heat from several sources. The procedure allo	lows for CH	JD and u	n to four	other heat	acuraca: H		(302)
includes boilers, heat pumps, geothermal and waste heat from power stations. See			p to tour t	otrier rieat	sources, u	ie ialler	
Fraction of heat from Community heat pump						1	(303a)
Fraction of total space heat from Community heat pump			(3	02) x (303	a) =	1	(304a)
Factor for control and charging method (Table 4c(3)) for communi	itv heatin	na svst	em		Ī	1	(305)
	,	.9 0,00	•			'	(000)
Distribution loss factor (Table 12c) for community heating system	•		•		[1.05	(306)
Distribution loss factor (Table 12c) for community heating system Space heating	•						(306)
	•	ing of or			 	1.05	(306)
Space heating				5) x (306) :	 -	1.05 kWh/y €	(306)
Space heating Annual space heating requirement	(9	98) x (30	4a) x (305		 -	1.05 kWh/ye 1870.88	(306)
Space heating Annual space heating requirement Space heat from Community heat pump	(9 n Table 4	98) x (30 la or Ap	4a) x (305	E)	 - 	1.05 kWh/ye 1870.88 1964.43	(306) ear (307a)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system)	(9 n Table 4	98) x (30 la or Ap	4a) x (305 opendix	E)	- - 	1.05 kWh/ye 1870.88 1964.43	(306) Par (307a) (308
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from	(9 n Table 4	98) x (30 la or Ap	4a) x (305 opendix	E)	- - 	1.05 kWh/ye 1870.88 1964.43	(306) Par (307a) (308
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system) Water heating	(9 n Table 4	98) x (30 la or Ap 98) x (30	4a) x (305 opendix 1) x 100 ÷	E)		1.05 kWh/ye 1870.88 1964.43 0	(306) Par (307a) (308
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump	(9 n Table 4: m (9	98) x (30 la or Ap 98) x (30 64) x (30	4a) x (305 opendix 1) x 100 ÷	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92	(306) Par (307a) (308 (309)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution	(9 n Table 4: m (9	98) x (30 la or Ap 98) x (30 64) x (30	4a) x (305 opendix 1) x 100 ÷	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57	(306) (307a) (308 (309) (310a) (313)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio	(9 m Table 4 m (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 ÷ 3a) x (305 .(307e) +	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57 0	(306) Par (307a) (308 (309) (310a) (313) (314)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0)	(9 m Table 4 m (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30	4a) x (305 opendix 1) x 100 ÷ 3a) x (305 .(307e) +	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57	(306) (307a) (308 (309) (310a) (313)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio	(9 n Table 4 m (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 ÷ 3a) x (305 .(307e) +	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57 0	(306) Par (307a) (308 (309) (310a) (313) (314)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f):	(9 n Table 4 m (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 ÷ 3a) x (305 .(307e) +	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57 0	(306) (307a) (308 (309) (310a) (313) (314) (315)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our	(9 n Table 4 m (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 ÷ 3a) x (305 .(307e) +	E) - (308) =	=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57 0 0 202.28	(306) Par (307a) (308 (309) (310a) (313) (314) (315) (330a)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our warm air heating system fans	(9 n Table 4: m (9 (6 0.01 × [=	98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 ÷ 3a) x (305 .(307e) +	E) - (308) = - (308) = - (306) : - (310a)(=	1.05 kWh/ye 1870.88 1964.43 0 0 2087.92 2192.31 41.57 0 0 202.28 0	(306) Par (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b)

Energy for lighting (calculated in Appe	endix L)			335.82	(332)
Total delivered energy for all uses (30	07) + (309) + (310) + (3	312) + (315) + (331)	+ (332)(237b) =	4694.84	(338)
10b. Fuel costs – Community heating	g scheme				
	Fuel kWh/ye	ear	Fuel Price (Table 12)	Fuel Cost £/year	
Space heating from CHP	(307a)	x	4.24 × 0.0	1 = 83.29	(340a)
Water heating from CHP	(310a)	x	4.24 × 0.0	1 = 92.95	(342a)
Dumns and fans	(331)		Fuel Price	1	7(0.40)
Pumps and fans	(332)		13.10	20.00	(349)
Energy for lighting			13.19 X 0.0	77.20](350)
Additional standing charges (Table 12	,			120	(351)
Total energy cost	= (340a)(342e) + (34	5)(354) =		367.22	(355)
11b. SAP rating - Community heating	g scheme				
Energy cost deflator (Table 12)				0.42	(356)
Energy cost factor (ECF)	$[(355) \times (356)] \div [(4) + 4]$	45.0] =		1.26	(357)
SAP rating (section12)				82.38	(358)
12b. CO2 Emissions – Community he	eating scheme	Engrav	Emissien foe	tor Emissions	
		Energy kWh/year	kg CO2/kWh	kg CO2/year	
CO2 from other sources of space and Efficiency of heat source 1 (%)			63) to (366) for the second	d fuel 383	(367a)
CO2 associated with heat source 1	[(30	07b)+(310b)] x 100 ÷ (367	b) x 0.52	= 563.28	(367)
Electrical energy for heat distribution		[(313) x	0.52	= 21.57	(372)
Total CO2 associated with community	y systems	(363)(366) + (368))(372)	= 584.85	(373)
CO2 associated with space heating (s	secondary)	(309) x	0	= 0	(374)
CO2 associated with water from imme	ersion heater or instan	taneous heater (31	2) x 0.22	= 0	(375)
					_
Total CO2 associated with space and	I water heating	(373) + (374) + (375)) =	584.85	(376)
Total CO2 associated with space and CO2 associated with electricity for pure	J		0.52	= 104.98	(376)
·	mps and fans within d				
CO2 associated with electricity for pur	mps and fans within d	welling (331)) x	0.52	= 104.98	(378)
CO2 associated with electricity for pur	mps and fans within d	welling (331)) x	0.52	= 104.98 = 174.29	(378)
CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year	mps and fans within don'thing sum of (376)(382) =	welling (331)) x	0.52	= 104.98 = 174.29 864.12	(378) (379) (383)
CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year Dwelling CO2 Emission Rate	mps and fans within density thing $sum of (376)(382) = (383) \div (4) =$	welling (331)) x (332))) x	0.52	= 104.98 = 174.29 864.12 11.21 90.52	(378) (379) (383) (384)
CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year Dwelling CO2 Emission Rate El rating (section 14)	mps and fans within density thing $sum of (376)(382) = (383) \div (4) =$	welling (331)) x	0.52	= 104.98 = 174.29 864.12	(378) (379) (383) (384)

Energy associated with heat source 1	[(307b)+(310b)] x 100 ÷ (367b) x	3.07	=	3331.9	(367)
Electrical energy for heat distribution	[(313) x		=	127.61	(372)
Total Energy associated with community systems	(363)(366) + (368)(372)		=	3459.51	(373)
if it is negative set (373) to zero (unless specified oth	erwise, see C7 in Appendix C)			3459.51	(373)
Energy associated with space heating (secondary)	(309) x	0	=	0	(374)
Energy associated with water from immersion heater or	r instantaneous heater(312) x	1.22	=	0	(375)
Total Energy associated with space and water heating	(373) + (374) + (375) =			3459.51	(376)
Energy associated with space cooling	(315) x	3.07	=	0	(377)
Energy associated with electricity for pumps and fans v	vithin dwelling (331)) x	3.07	=	621.01	(378)
Energy associated with electricity for lighting	(332))) x	3.07	=	1030.96	(379)
Total Primary Energy, kWh/year sun	n of (376)(382) =			5111.48	(383)

		l lser I	Details:						
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012	<u> </u>	Strom Softwa					036639 on: 1.0.5.17	
	F	Property	Address	: D1-05					
Address :									
Overall dwelling dime	ensions:	Δ = 0	a/m²\		Av. Ua	iaht(m)		Valuma/m³	81
Ground floor			77.11	(1a) x		ight(m)	(2a) =	Volume(m ³	(3a)
	a)+(1b)+(1c)+(1d)+(1e)+(1			(4)			()	217.40	(***)
	a)1(1b)1(10)1(10)1(10)1(1	'''	77.11	J) 1 (3c)1(3c	d)+(3e)+	(3n) -		7.6
Dwelling volume				(54)1(55	71 (30) 1 (30	a)	(311) =	217.45	(5)
2. Ventilation rate:	main seconda	ry	other		total			m³ per hou	ır
Number of chimneys	heating heating bearing heating	□ + □	0	7 = F	0	x 4	0 =	0	(6a)
Number of open flues	0 + 0	_	0	」	0	x 2	0 =		(6b)
Number of intermittent fa				┙┟			0 =	0	╡`´
				Ļ	0		0 =	0	(7a)
Number of passive vents				Ļ	0			0	(7b)
Number of flueless gas f	ires				0	X 4	0 =	0	(7c)
							Air ch	anges per ho	our
Infiltration due to chimne	ys, flues and fans = (6a)+(6b)+(7a)+(7b)+	(7c) =	Γ	0		- (5) =	0	(8)
If a pressurisation test has b	peen carried out or is intended, procee	ed to (17),	otherwise o	continue fr	rom (9) to				
Number of storeys in t	he dwelling (ns)							0	(9)
Additional infiltration	.25 for steel or timber frame o	r 0 35 fo	r macani	ny coneti	ruction	[(9)-	1]x0.1 =	0	(10)
	resent, use the value corresponding t			•	uction			0	(11)
deducting areas of openi	5 /·	. 4. / 1	- 1\ -1				1		-
If suspended wooden to the sus	floor, enter 0.2 (unsealed) or 0	.1 (seal	ea), eise	enter U				0	(12)
•	s and doors draught stripped							0	(13)
Window infiltration	o and doors araugin empped		0.25 - [0.2	2 x (14) ÷ 1	100] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13)	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cubic metro	es per h	our per s	quare m	etre of e	envelope	area	3	(17)
•	lity value, then $(18) = [(17) \div 20] + (18)$							0.15	(18)
Air permeability value applie Number of sides sheltere	es if a pressurisation test has been do	ne or a de	gree air pe	rmeability	is being u	sed			7(40)
Shelter factor	eu		(20) = 1 -	[0.075 x (²	19)] =			0.85	(19) (20)
Infiltration rate incorpora	ting shelter factor		(21) = (18	s) x (20) =				0.13	(21)
Infiltration rate modified f	for monthly wind speed								
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Table 7								
(22)m= 5.1 5	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2	2)m <i>÷ 4</i>								
(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		
` '	1 1 1 1 1 1 1 1 1 1		1					I	

Adjusted infiltr	ation rat	e (allowi	ing for sh	nelter an	d wind s	speed) =	: (21a) x	(22a)m					
0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15]	
Calculate effec		_	rate for t	he appli	cable ca	se				!		J	
If mechanica												0.5	(23a
If exhaust air h									o) = (23a)			0.5	(23b
If balanced with	n heat reco	overy: effic	eiency in %	allowing t	or in-use f	actor (fror	n Table 4h	n) =				74.8	(23c)
a) If balance		anical ve		with he		- ` ` 	- ^ ` -	í `	2b)m + (23b) × [÷ 100]	
(24a)m= 0.29	0.29	0.28	0.27	0.26	0.25	0.25	0.24	0.25	0.26	0.27	0.28		(24a
b) If balance	ed mech	anical ve	entilation	without	heat red	covery (MV) (24k	p)m = (2x)	2b)m + (23b)	·	1	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24b
c) If whole h if (22b)n				•	e input vo); other				.5 × (23t	o)		_	
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(240
d) If natural if (22b)n					ve input erwise (2				0.5]				
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(240
Effective air	change	rate - er	nter (24a	or (24l	o) or (24	c) or (24	ld) in bo	x (25)	-	-		•	
(25)m= 0.29	0.29	0.28	0.27	0.26	0.25	0.25	0.24	0.25	0.26	0.27	0.28]	(25)
3. Heat losse	e and he	nat loss i	naramet	or:					•				
ELEMENT	Gros area	SS	Openin m	gs	Net Ar A ,r		U-val W/m2		A X U (W/		k-value kJ/m²-		A X k kJ/K
Doors					2.52	х	0.91	=	2.2932	2			(26)
Windows Type	e 1				2.9	x1	/[1/(1.4)+	0.04] =	3.84	=			(27)
Windows Type	2				5.45	x1	/[1/(1.4) 	- 0.04] =	7.23	=			(27)
Windows Type	3				1.99	x1	/[1/(1.4)+	- 0.04] =	2.64				(27)
Windows Type	e 4				0.9	x1	/[1/(1.4) +	- 0.04] =	1.19	=			(27)
Windows Type					0.62	=	/[1/(1.4)+		0.82	_			(27)
Windows Type					1.99	= ,	·		2.64	=			(27)
Windows Type					0.9	_	/[1/(1.4)+		1.19	_			(27)
Windows Type						= ,	/[1/(1.4)+ /[1/(1.4)+			=			
Walls Type1			00.4		1.99	=			2.64				(27)
• • • • • • • • • • • • • • • • • • • •	76.4	_	22.1	<u> </u>	54.32	=	0.14	=	7.6	믁 ¦			(29)
Walls Type2	21.3		0	<u></u>	21.38	3 ×	0.17	=	3.62	_		_	(29)
Walls Type3	7.0	5	0	=	7.05	×	0.2	=	1.41	_		_ _	(29)
Roof	77.1		0		77.11	X	0.1	=	7.71				(30)
Total area of e					182.0								(31)
* for windows and ** include the area		•				ated usin	g formula 1	1/[(1/U-valu	ue)+0.04] á	as given in	n paragrapl	1 3.2	
Fabric heat los				pui			(26)(30) + (32) =				48.67	(33)
Heat capacity		•	,					((28).	(30) + (3	2) + (32a)	(32e) =	0	(34)
Thermal mass		` ,	⊃ = Cm ÷	: TFA) ir	n kJ/m²K			,,,,,	ative Value	, , ,	,	250	(35)
		,		,									(10)

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f

oon he wood insta	ad of a do	tailed ealer	ulation										
can be used instead Thermal bridge				usina Ar	nendix k	<						13.86	(36)
if details of therma					-	`						13.00	(30)
Total fabric hea	0 0		()	(-	-/			(33) +	(36) =			62.53	(37)
Ventilation hea	at loss ca	alculated	l monthly	y				(38)m	= 0.33 × (25)m x (5))		_
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 20.71	20.48	20.25	19.11	18.88	17.73	17.73	17.5	18.19	18.88	19.33	19.79		(38)
Heat transfer of	coefficier	nt, W/K		-		-	-	(39)m	= (37) + (37)	38)m	-	-	
(39)m= 83.23	83.01	82.78	81.63	81.4	80.26	80.26	80.03	80.72	81.4	81.86	82.32		
Heat loss para	meter (H	HLP), W/	′m²K						Average = = (39)m ÷	Sum(39) ₁ · (4)	12 /12=	81.58	(39)
(40)m= 1.08	1.08	1.07	1.06	1.06	1.04	1.04	1.04	1.05	1.06	1.06	1.07		
Nivershau of day		ath /Tab	lo 4o\					,	Average =	Sum(40) ₁	12 /12=	1.06	(40)
Number of day Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1	
(41)m= 31	28	31	30	31	30	31	31	30	31	30	31	<u> </u>	(41)
(11)												J	, ,
4. Water heat	ing ener	rav regui	rement:								kWh/y	ear:	
			rement.								ICVVII/ y	-	
Assumed occu if TFA > 13.9	9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.		.41		(42)
if TFA £ 13.9 Annual averag	•	ater usac	ge in litre	es per da	ıv Vd,av	erage =	(25 x N)	+ 36		91	.34	1	(43)
Reduce the annua	al average	hot water	usage by	5% if the a	welling is	designed			se target o			J	(12)
not more that 125	litres per j	person per	aay (ali w	rater use, i I	not and co	ia) I	ı			1	i	1	
Jan Hot water usage ir	Feb	Mar day for ea	Apr	May	Jun	Jul Table 10 x	Aug	Sep	Oct	Nov	Dec		
								00.54	00.40	00.00	100.47	1	
(44)m= 100.47	96.82	93.16	89.51	85.86	82.2	82.2	85.86	89.51	93.16	96.82 m(44) ₁₁₂ =	100.47	1006.04	(44)
Energy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x E	OTm / 3600			(/		1096.04	(++)
(45)m= 148.99	130.31	134.47	117.23	112.49	97.07	89.95	103.22	104.45	121.73	132.87	144.29]	
							•		Total = Su	m(45) ₁₁₂ =	=	1437.08	(45)
If instantaneous w		ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46,) to (61)			1	1	
(46)m= 22.35 Water storage	19.55	20.17	17.59	16.87	14.56	13.49	15.48	15.67	18.26	19.93	21.64		(46)
Storage volum		includin	ia anv so	olar or W	/WHRS	storage	within sa	ame ves	sel		0	1	(47)
If community h	` ,					•						J	()
Otherwise if no	•			•			` '	ers) ente	er '0' in (47)			
Water storage												•	
a) If manufact				or is kno	wn (kWh	n/day):					0]	(48)
Temperature fa											0		(49)
Energy lost fro b) If manufact		-	-		or is not		(48) x (49)	=		1	10		(50)
Hot water stora			-							0.	.02	1	(51)
If community h	eating s	ee sectio		•									• •
Volume factor			Ol-							-	.03		(52)
Temperature fa	actor fro	ın rable	∠D							0	0.6	J	(53)

Entor (EO) or (EA) :- (E	r storage,	kWh/ye	ear			(47) x (51)) x (52) x (53) =	1.	.03		(54)
Enter (50) or (54) in (5	55)								1.	.03		(55)
Water storage loss cal	culated fo	or each	month			((56)m = (55) × (41)r	m				
(56)m= 32.01 28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinder contains dedicate	d solar stora	age, (57)n	n = (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) fror	n Table	3							0		(58)
Primary circuit loss cal	culated fo	or each	month (59)m = ((58) ÷ 36	65 × (41)	m				•	
(modified by factor fi	rom Table	H5 if th	here is s	olar wat	ter heatii	ng and a	cylinde	r thermo	stat)			
(59)m= 23.26 21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi loss calculated	for each r	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 hea	ating ca	lculated	for eac	h month	(62)m =	0.85 × (45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 204.27 180.24	189.75	170.73	167.77	150.56	145.23	158.49	157.94	177	186.37	199.57		(62)
Solar DHW input calculated	using Appe	ndix G or	Appendix	H (negati	ve quantity	/) (enter '0	if no sola	r contribut	ion to wate	er heating)	ı	
(add additional lines if	FGHRS a	and/or V	VWHRS	applies	, see Ap	pendix (3)					
(63)m= 0 0	0	0	0	0	0	0	0	0	0	0		(63)
Output from water hea	ter	•				•			•		•	
(64)m= 204.27 180.24	189.75	170.73	167.77	150.56	145.23	158.49	157.94	177	186.37	199.57		
<u> </u>						Outp	out from wa	ater heate	r (annual)₁	12	2087.92	(64)
Heat gains from water	heating, I	kWh/mc	onth 0.25	5 ′ [0.85	× (45)m	+ (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)m	1	
(65)m= 93.76 83.27	88.93	81.78	81.62	75.07	74.13	78.54	77.52	84.7	86.98	92.2	_	(65)
include (57)m in cald										-		(00)
morade (37)III III Calc	culation of	f (65)m	only if c	ylinder i	s in the o	dwelling	or hot w	ater is fr	<u> </u>		l eating	(55)
` '				ylinder i	s in the o	dwelling	or hot w	ater is fr	<u> </u>		eating	(00)
5. Internal gains (see	e Table 5	and 5a)		ylinder i	s in the o	dwelling	or hot w	ater is fr	<u> </u>		eating	(66)
5. Internal gains (see Metabolic gains (Table	e Table 5 a	and 5a)	:						om com	munity h	eating	
5. Internal gains (see Metabolic gains (Table Jan Feb	E Table 5 and 5 (2) Table 5 (2) Watts	and 5a) s Apr	: May	Jun	Jul	Aug	Sep	Oct	om com	munity h	eating	(66)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29	2 5), Watts Mar 120.29	and 5a) s Apr 120.29	May 120.29	Jun 120.29	Jul 120.29	Aug 120.29	Sep 120.29	Oct	om com	munity h	eating	
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula	Mar 120.29 ted in App	and 5a) s Apr 120.29 pendix L	May 120.29 _, equati	Jun 120.29 on L9 o	Jul 120.29 r L9a), a	Aug 120.29	Sep 120.29 Table 5	Oct 120.29	Nov	Dec	eating	(66)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89	Mar 120.29 ted in App	and 5a) s Apr 120.29 pendix L	May 120.29 , equati 7.77	Jun 120.29 on L9 o 6.56	Jul 120.29 r L9a), a 7.09	Aug 120.29 Iso see	Sep 120.29 Table 5 12.37	Oct 120.29	om com	munity h	eating	
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula	Mar 120.29 ted in App 13.74	Apr 120.29 pendix L 10.4	May 120.29 _, equati 7.77	Jun 120.29 on L9 o 6.56 uation L	Jul 120.29 r L9a), a 7.09 13 or L1	Aug 120.29 Iso see 9.22 3a), also	Sep 120.29 Table 5 12.37	Oct 120.29 15.71 ole 5	Nov 120.29	Dec 120.29	eating	(66) (67)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51	Mar 120.29 ted in App 13.74 culated in 209.93	and 5a) s Apr 120.29 pendix L 10.4 Append 198.06	May 120.29 -, equati 7.77 lix L, equ	Jun 120.29 on L9 o 6.56 uation L 168.98	Jul 120.29 r L9a), a 7.09 13 or L1	Aug 120.29 Iso see 9.22 3a), also	Sep 120.29 Table 5 12.37 see Tal 162.93	Oct 120.29 15.71 ole 5	Nov	Dec	eating	(66)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51 Cooking gains (calcula	Mar 120.29 ted in App 13.74 culated in App 209.93 ated in App	Apr 120.29 pendix L 10.4 Append 198.06 pendix	May 120.29 _, equati 7.77 lix L, equ 183.07 L, equat	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a)	Aug 120.29 Iso see 9.22 3a), also 157.36	Sep 120.29 Table 5 12.37 See Tal 162.93	Oct 120.29 15.71 ole 5 174.81 5	Nov 120.29 18.33	Dec 120.29 19.54 203.88	eating	(66) (67) (68)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51 Cooking gains (calcula (69)m= 35.03 35.03	Mar 120.29 ted in App 13.74 culated in App 209.93 ated in App 35.03	Apr 120.29 pendix L Append 198.06 pendix 35.03	May 120.29 -, equati 7.77 lix L, equ	Jun 120.29 on L9 o 6.56 uation L 168.98	Jul 120.29 r L9a), a 7.09 13 or L1	Aug 120.29 Iso see 9.22 3a), also	Sep 120.29 Table 5 12.37 see Tal 162.93	Oct 120.29 15.71 ole 5	Nov 120.29	Dec 120.29	eating	(66) (67)
Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51 Cooking gains (calcula (69)m= 35.03 35.03 Pumps and fans gains	Mar 120.29 ted in App 13.74 culated in App 209.93 ated in App 35.03 (Table 5a	and 5a) s Apr 120.29 pendix L 10.4 Append 198.06 pendix I 35.03 a)	May 120.29 -, equati 7.77 lix L, equ 183.07 L, equat 35.03	Jun 120.29 on L9 o 6.56 uation L 168.98 ion L15 35.03	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36), also se 35.03	Sep 120.29 Table 5 12.37 o see Tal 162.93 ee Table 35.03	Oct 120.29 15.71 ole 5 174.81 5 35.03	Nov 120.29 18.33 189.8	Dec 120.29 19.54 203.88	eating	(66) (67) (68) (69)
Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcular (67)m= 19.02 16.89 Appliances gains (calcular (68)m= 213.29 215.51 Cooking gains (calcular (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0	Mar 120.29 ted in App 13.74 culated in App 35.03 ted in A	and 5a) s Apr 120.29 pendix L 10.4 Appendix 198.06 pendix 35.03 a) 0	May 120.29 -, equati 7.77 lix L, equ 183.07 L, equat 35.03	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a)	Aug 120.29 Iso see 9.22 3a), also 157.36	Sep 120.29 Table 5 12.37 See Tal 162.93	Oct 120.29 15.71 ole 5 174.81 5	Nov 120.29 18.33	Dec 120.29 19.54 203.88	eating	(66) (67) (68)
Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51 Cooking gains (calcula (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporation	Mar 120.29 ted in App 13.74 culated in App 209.93 ated in App 35.03 c (Table 5a	Appendix L 198.06 pendix I 35.03 a) ve value	May 120.29 _, equati 7.77 lix L, equ 183.07 L, equat 35.03 0 es) (Tab	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36), also se 35.03	Sep 120.29 Table 5 12.37 See Tal 162.93 ee Table 35.03	Oct 120.29 15.71 cole 5 174.81 5 35.03	Nov 120.29 18.33 189.8	Dec 120.29 19.54 203.88 35.03	eating	(66) (67) (68) (69) (70)
Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcular (67)m= 19.02 16.89 Appliances gains (calcular (68)m= 213.29 215.51 Cooking gains (calcular (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0	Mar 120.29 ted in App 13.74 culated in App 35.03 ted in A	and 5a) s Apr 120.29 pendix L 10.4 Appendix 198.06 pendix 35.03 a) 0	May 120.29 -, equati 7.77 lix L, equ 183.07 L, equat 35.03	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36), also se 35.03	Sep 120.29 Table 5 12.37 o see Tal 162.93 ee Table 35.03	Oct 120.29 15.71 ole 5 174.81 5 35.03	Nov 120.29 18.33 189.8	Dec 120.29 19.54 203.88	eating	(66) (67) (68) (69)
Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51 Cooking gains (calcula (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporation	Mar 120.29 ted in App 13.74 culated in App 35.03 (Table 5a 0 on (negative -96.23)	Appendix L 198.06 pendix I 35.03 a) ve value	May 120.29 _, equati 7.77 lix L, equ 183.07 L, equat 35.03 0 es) (Tab	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36), also se 35.03	Sep 120.29 Table 5 12.37 See Tal 162.93 ee Table 35.03	Oct 120.29 15.71 cole 5 174.81 5 35.03	Nov 120.29 18.33 189.8	Dec 120.29 19.54 203.88 35.03	eating	(66) (67) (68) (69) (70) (71)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcular (67)m= 19.02 16.89 Appliances gains (calcular (68)m= 213.29 215.51 Cooking gains (calcular (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporation (71)m= -96.23 -96.23	Mar 120.29 ted in App 13.74 culated in App 35.03 ted in App 35.03 ted in App 36.03 frable 5a on (negative-96.23 frable 5)	Appendix L 198.06 pendix I 35.03 a) ve value	May 120.29 _, equati 7.77 lix L, equ 183.07 L, equat 35.03 0 es) (Tab	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36), also se 35.03	Sep 120.29 Table 5 12.37 See Tal 162.93 ee Table 35.03	Oct 120.29 15.71 cole 5 174.81 5 35.03	Nov 120.29 18.33 189.8	Dec 120.29 19.54 203.88 35.03	eating	(66) (67) (68) (69) (70)
Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcula (67)m= 19.02 16.89 Appliances gains (calcula (68)m= 213.29 215.51 Cooking gains (calcula (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporatio (71)m= -96.23 -96.23 Water heating gains (T	Mar 120.29 ted in App 13.74 culated in App 35.03 (Table 5a 0 on (negative -96.23) Table 5) 119.53	and 5a) s Apr 120.29 pendix L 10.4 Append 198.06 pendix 35.03 a) 0 ve value -96.23	May 120.29 ., equati 7.77 lix L, equ 183.07 L, equat 35.03 0 es) (Tab -96.23	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03 0 le 5) -96.23	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36 , also se 35.03	Sep 120.29 Table 5 12.37 See Tal 162.93 ee Table 35.03	Oct 120.29 15.71 cole 5 174.81 5 35.03 0 -96.23	Nov 120.29 18.33 189.8 35.03	Dec 120.29 19.54 203.88 35.03 0	eating	(66) (67) (68) (69) (70) (71)
5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 120.29 120.29 Lighting gains (calcular (67)m= 19.02 16.89 Appliances gains (calcular (68)m= 213.29 215.51 Cooking gains (calcular (69)m= 35.03 35.03 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporation (71)m= -96.23 -96.23 Water heating gains (T (72)m= 126.02 123.91	Mar 120.29 ted in App 13.74 culated in App 35.03 (Table 5a 0 on (negative -96.23 Table 5) 119.53	and 5a) s Apr 120.29 pendix L 10.4 Append 198.06 pendix 35.03 a) 0 ve value -96.23	May 120.29 ., equati 7.77 lix L, equ 183.07 L, equat 35.03 0 es) (Tab -96.23	Jun 120.29 on L9 of 6.56 uation L 168.98 ion L15 35.03 0 le 5) -96.23	Jul 120.29 r L9a), a 7.09 13 or L1 159.57 or L15a) 35.03	Aug 120.29 Iso see 9.22 3a), also 157.36 , also se 35.03	Sep 120.29 Table 5 12.37 See Tal 162.93 See Table 35.03	Oct 120.29 15.71 cole 5 174.81 5 35.03 0 -96.23	Nov 120.29 18.33 189.8 35.03	Dec 120.29 19.54 203.88 35.03 0	eating	(66) (67) (68) (69) (70) (71)

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

Orientation: Access Factor Table 6d	r	Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast _{0.9x} 0.77	x	1.99	x	11.28	x	0.4	x	0.8] =	4.98	(75)
Northeast _{0.9x} 0.77	x	1.99	x	22.97	x	0.4	X	0.8	=	10.14	(75)
Northeast 0.9x 0.77	x	1.99	x	41.38	x	0.4	x	0.8	=	18.26	(75)
Northeast _{0.9x} 0.77	x	1.99	x	67.96	x	0.4	x	0.8	=	29.99	(75)
Northeast _{0.9x} 0.77	x	1.99	x	91.35	x	0.4	X	0.8	=	40.31	(75)
Northeast 0.9x 0.77	x	1.99	x	97.38	x	0.4	x	0.8	=	42.98	(75)
Northeast _{0.9x} 0.77	x	1.99	x	91.1	x	0.4	x	0.8	=	40.2	(75)
Northeast _{0.9x} 0.77	x	1.99	x	72.63	x	0.4	x	0.8	=	32.05	(75)
Northeast _{0.9x} 0.77	x	1.99	x	50.42	x	0.4	x	0.8	=	22.25	(75)
Northeast _{0.9x} 0.77	x	1.99	x	28.07	x	0.4	x	0.8	=	12.39	(75)
Northeast _{0.9x} 0.77	x	1.99	x	14.2	x	0.4	x	0.8	=	6.27	(75)
Northeast _{0.9x} 0.77	x	1.99	x	9.21	x	0.4	x	0.8	=	4.07	(75)
Southeast 0.9x 0.77	x	2.9	x	36.79	x	0.4	x	0.8	=	23.66	(77)
Southeast 0.9x 0.77	x	5.45	x	36.79	x	0.4	x	0.8	=	44.47	(77)
Southeast 0.9x 0.77	x	2.9	x	62.67	x	0.4	x	0.8	=	40.31	(77)
Southeast 0.9x 0.77	x	5.45	x	62.67	x	0.4	X	0.8	=	75.75	(77)
Southeast 0.9x 0.77	x	2.9	x	85.75	x	0.4	x	0.8	=	55.15	(77)
Southeast 0.9x 0.77	x	5.45	x	85.75	x	0.4	x	0.8	=	103.64	(77)
Southeast 0.9x 0.77	x	2.9	x	106.25	x	0.4	X	0.8	=	68.33	(77)
Southeast 0.9x 0.77	x	5.45	x	106.25	x	0.4	x	0.8	=	128.41	(77)
Southeast 0.9x 0.77	x	2.9	x	119.01	x	0.4	x	0.8	=	76.54	(77)
Southeast 0.9x 0.77	x	5.45	x	119.01	x	0.4	X	0.8	=	143.84	(77)
Southeast 0.9x 0.77	x	2.9	x	118.15	x	0.4	x	0.8	=	75.98	(77)
Southeast 0.9x 0.77	x	5.45	x	118.15	x	0.4	x	0.8	=	142.8	(77)
Southeast 0.9x 0.77	x	2.9	x	113.91	x	0.4	x	0.8	=	73.26	(77)
Southeast 0.9x 0.77	x	5.45	x	113.91	x	0.4	x	0.8	=	137.67	(77)
Southeast 0.9x 0.77	x	2.9	x	104.39	x	0.4	x	0.8	=	67.13	(77)
Southeast 0.9x 0.77	x	5.45	x	104.39	x	0.4	x	0.8	=	126.17	(77)
Southeast 0.9x 0.77	x	2.9	x	92.85	x	0.4	x	0.8	=	59.71	(77)
Southeast 0.9x 0.77	x	5.45	x	92.85	x	0.4	x	0.8	=	112.22	(77)
Southeast 0.9x 0.77	x	2.9	x	69.27	x	0.4	x	0.8	=	44.55	(77)
Southeast 0.9x 0.77	x	5.45	x	69.27	x	0.4	x	0.8	=	83.72	(77)
Southeast 0.9x 0.77	x	2.9	x	44.07	x	0.4	x	0.8	=	28.34	(77)
Southeast 0.9x 0.77	x	5.45	x	44.07	x	0.4	x	0.8	=	53.26	(77)
Southeast 0.9x 0.77	x	2.9	x	31.49	x	0.4	x	0.8	=	20.25	(77)
Southeast 0.9x 0.77	X	5.45	x	31.49	x	0.4	x	0.8	=	38.06	(77)
Southwest _{0.9x} 0.77	X	1.99	x	36.79]	0.4	x	0.8] =	16.24	(79)
Southwest _{0.9x} 0.77	X	0.9	x	36.79]	0.4	x	0.8	=	14.69	(79)
Southwest _{0.9x} 0.77	X	1.99	x	62.67]	0.4	X	0.8	=	27.66	(79)

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Southwest _{0.9x}	0.77	X	0.9	X	62.67	<u> </u>	0.4	X	0.8] =	25.02	(79)
Southwest _{0.9x}	0.77	X	1.99	X	85.75	ļ	0.4	X	0.8	=	37.84	(79)
Southwest _{0.9x}	0.77	X	0.9	X	85.75	_	0.4	X	0.8	=	34.23	(79)
Southwest _{0.9x}	0.77	X	1.99	X	106.25	ļ	0.4	X	0.8	=	46.89	(79)
Southwest _{0.9x}	0.77	X	0.9	X	106.25	[0.4	X	0.8	=	42.41	(79)
Southwest _{0.9x}	0.77	X	1.99	X	119.01	<u> </u>	0.4	X	0.8	=	52.52	(79)
Southwest _{0.9x}	0.77	X	0.9	X	119.01	<u> </u>	0.4	X	0.8	=	47.51	(79)
Southwest _{0.9x}	0.77	X	1.99	X	118.15]	0.4	X	0.8	=	52.14	(79)
Southwest _{0.9x}	0.77	X	0.9	X	118.15		0.4	X	0.8	=	47.16	(79)
Southwest _{0.9x}	0.77	X	1.99	X	113.91]	0.4	X	0.8	=	50.27	(79)
Southwest _{0.9x}	0.77	X	0.9	X	113.91		0.4	X	0.8	=	45.47	(79)
Southwest _{0.9x}	0.77	X	1.99	X	104.39]	0.4	x	0.8	=	46.07	(79)
Southwest _{0.9x}	0.77	X	0.9	X	104.39		0.4	X	0.8	=	41.67	(79)
Southwest _{0.9x}	0.77	X	1.99	X	92.85]	0.4	X	0.8	=	40.98	(79)
Southwest _{0.9x}	0.77	X	0.9	X	92.85]	0.4	X	0.8	=	37.06	(79)
Southwest _{0.9x}	0.77	X	1.99	x	69.27]	0.4	X	0.8	=	30.57	(79)
Southwest _{0.9x}	0.77	X	0.9	X	69.27]	0.4	x	0.8	=	27.65	(79)
Southwest _{0.9x}	0.77	X	1.99	X	44.07]	0.4	x	0.8	=	19.45	(79)
Southwest _{0.9x}	0.77	X	0.9	x	44.07]	0.4	x	0.8	=	17.59	(79)
Southwest _{0.9x}	0.77	X	1.99	x	31.49]	0.4	X	0.8	=	13.9	(79)
Southwest _{0.9x}	0.77	X	0.9	X	31.49]	0.4	x	0.8	=	12.57	(79)
Northwest _{0.9x}	0.77	X	1.99	x	11.28	x	0.4	x	0.8	=	9.96	(81)
Northwest _{0.9x}	0.77	X	0.9	X	11.28	X	0.4	X	0.8] =	2.25	(81)
Northwest _{0.9x}	0.77	X	0.62	x	11.28	x	0.4	X	0.8	=	1.55	(81)
Northwest _{0.9x}	0.77	X	1.99	x	22.97	x	0.4	X	0.8	=	20.27	(81)
Northwest _{0.9x}	0.77	X	0.9	x	22.97	X	0.4	X	0.8	=	4.58	(81)
Northwest _{0.9x}	0.77	X	0.62	x	22.97	x	0.4	x	0.8	=	3.16	(81)
Northwest _{0.9x}	0.77	X	1.99	x	41.38	x	0.4	X	0.8	=	36.52	(81)
Northwest _{0.9x}	0.77	X	0.9	x	41.38	X	0.4	X	0.8	=	8.26	(81)
Northwest 0.9x	0.77	X	0.62	x	41.38	x	0.4	x	0.8	=	5.69	(81)
Northwest _{0.9x}	0.77	X	1.99	x	67.96	x	0.4	x	0.8	=	59.98	(81)
Northwest _{0.9x}	0.77	X	0.9	x	67.96	x	0.4	x	0.8	=	13.56	(81)
Northwest 0.9x	0.77	X	0.62	x	67.96	x	0.4	х	0.8	=	9.34	(81)
Northwest _{0.9x}	0.77	X	1.99	x	91.35	x	0.4	x	0.8	=	80.62	(81)
Northwest _{0.9x}	0.77	X	0.9	x	91.35	x	0.4	x	0.8	=	18.23	(81)
Northwest _{0.9x}	0.77	x	0.62	x	91.35	x	0.4	x	0.8] =	12.56	(81)
Northwest _{0.9x}	0.77	x	1.99	x	97.38	x	0.4	x	0.8] =	85.95	(81)
Northwest _{0.9x}	0.77	x	0.9	x	97.38	x	0.4	x	0.8	=	19.44	(81)
Northwest _{0.9x}	0.77	x	0.62	x	97.38	x	0.4	x	0.8	=	13.39	(81)
Northwest _{0.9x}	0.77	x	1.99	x	91.1	x	0.4	x	0.8] =	80.41	(81)
Northwest _{0.9x}	0.77	x	0.9	x	91.1	x	0.4	x	0.8	=	18.18	(81)
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Northwest 0.9x	0.77	X	0.6	62	X	9	91.1	x	0.4	X		0.8		=	12.53	(81)
Northwest _{0.9x}	0.77	x	1.9	99	x	7:	2.63	x	0.4	X		0.8		=	64.1	(81)
Northwest _{0.9x}	0.77	x	0.9	9	x	7:	2.63	x	0.4	×		0.8		=	14.5	(81)
Northwest _{0.9x}	0.77	x	0.6	32	x	7:	2.63	x	0.4	×		0.8		=	9.99	(81)
Northwest _{0.9x}	0.77	×	1.9	99	x	5	0.42	x	0.4	x	· Ē	0.8		=	44.5	(81)
Northwest 0.9x	0.77	x	0.9	9	x	5	0.42	x	0.4	x	Ē	0.8		=	10.06	(81)
Northwest 0.9x	0.77	x	0.6	52	x	5	0.42	x	0.4	x	Ē	0.8		=	6.93	(81)
Northwest 0.9x	0.77	x	1.9	99	x	2	8.07	x	0.4	x	Ē	0.8	司	=	24.77	(81)
Northwest _{0.9x}	0.77	x	0.9	9	x	2	8.07	x	0.4	x	Ē	0.8		=	5.6	(81)
Northwest 0.9x	0.77	x	0.6	62	x	2	8.07	x	0.4	×		0.8		=	3.86	(81)
Northwest _{0.9x}	0.77	x	1.9	99	x	1	4.2	x	0.4	×		0.8		=	12.53	(81)
Northwest _{0.9x}	0.77	x	0.9	9	x	1	4.2	x	0.4	×		0.8		=	2.83	(81)
Northwest _{0.9x}	0.77	x	0.6	62	x	1	4.2	x	0.4	×	Ē	0.8		=	1.95	(81)
Northwest _{0.9x}	0.77	x	1.9	99	x	9	9.21	x	0.4	×		0.8		=	8.13	(81)
Northwest _{0.9x}	0.77	x	0.9	9	x	9	9.21	x	0.4	×		0.8		=	1.84	(81)
Northwest _{0.9x}	0.77	x	0.6	62	x	9	9.21	x	0.4	×	Ē	0.8		=	1.27	(81)
								-								
Solar gains in v	watts, calc	ulated	for eacl	h mont	h			(83)m	n = Sum(74)m	ı(82)	m					
(83)m= 117.8		299.59	398.92	472.12	\neg	79.83	457.98	401	.67 333.72	233	3.1	142.23	100.0	08		(83)
Total gains – ir	nternal and	d solar	(84)m =	= (73)m	1 + (83)m ,	watts		•						-	
(84)m= 535.22	622.27 7	701.87	780.04	831.76	8	18.73	783.36	732	.89 675.78	596.	.54	530.24	506.	51		(84)
								ı								
7. Mean intern	nal temper	rature (heating	seaso	n)				,							
7. Mean interr Temperature	•	`				area f	rom Tal	ole 9	Th1 (°C)						21	(85)
Temperature	during hea	ating pe	eriods ir	n the liv	/ing			ole 9	, Th1 (°C)						21	(85)
Temperature Utilisation fac	during hea	ating pe	eriods ir ving are	n the live a, h1,r	/ing m (s	ee Ta	ble 9a)				ct	Nov	De	ec	21	(85)
Temperature	during heator for gair	ating pe	eriods ir	n the liv	/ing m (s				ug Sep	0.9		Nov 0.99	De	ЭС	21	(85)
Temperature Utilisation fact Jan (86)m= 1	during heator for gair Feb 0.99	ating pens for li Mar	eriods ir ving are Apr 0.92	n the livea, h1,r May	ving m (s	ee Ta Jun ^{0.61}	Jul 0.45	A 0.	ug Sep 5 0.75	+		+ +		ЭС	21	
Temperature Utilisation factors Jan (86)m= 1 Mean internal	during heator for gair Feb 0.99 temperate	ating pens for li Mar 0.98	eriods ir ving are Apr 0.92 iving are	n the livea, h1,r May 0.8	ving m (s	ee Ta Jun 0.61 ow ster	ble 9a) Jul 0.45 os 3 to 7	A 0. 'in T	ug Sep 5 0.75 Table 9c)	0.9)5	0.99	1		21	(86)
Temperature Utilisation fact Jan (86)m= 1	during heator for gair Feb 0.99 temperate	ating pens for li Mar	eriods ir ving are Apr 0.92	n the livea, h1,r May	ving m (s	ee Ta Jun ^{0.61}	Jul 0.45	A 0.	ug Sep 5 0.75 Table 9c)	+)5	+ +			21	
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature	during heator for gair Feb 0.99 temperate 20.11	ns for li Mar 0.98 ure in li 20.36	eriods ir ving are Apr 0.92 iving are 20.67 eriods ir	n the livea, h1,r May 0.8 ea T1 (20.89	ring m (s r follo	ee Ta Jun 0.61 ow ster 20.98 velling	Jul 0.45 os 3 to 7	A 0 7 in T 20.	ug Sep 5 0.75 Table 9c) 99 20.94	20.6)5	0.99	1		21	(86)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94	during heator for gair Feb 0.99 temperate 20.11	ns for li Mar 0.98 ure in li	eriods ir ving are Apr 0.92 iving are	n the livea, h1,r May 0.8 ea T1 (20.89	ring m (s r follo	ee Ta Jun 0.61 ow step 20.98	Jul 0.45 os 3 to 7	A 0 7 in T 20.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C)	20.6	05 65	0.99	1)1	21	(86)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature	during heater for gair Feb 0.99 temperate 20.11 cduring heater 20.02 cd	ns for li Mar 0.98 ure in li 20.36 ating pe	eriods ir ving are Apr 0.92 iving are 20.67 eriods ir 20.03	n the lives, h1,1,1 May 0.8 ea T1 (20.89 n rest o 20.04	ring m (s	Jun 0.61 www.step 20.98 velling 20.05	Jul 0.45 os 3 to 7 21 from Ta 20.05	A 0 7 in T 20 able 9	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C)	20.6	05 65	0.99	19.9)1	21	(86)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02	during heater for gair Feb 0.99 temperate 20.11 20.02 tor for gair	ns for li Mar 0.98 ure in li 20.36 ating pe	eriods ir ving are Apr 0.92 iving are 20.67 eriods ir 20.03	n the lives, h1,1,1 May 0.8 ea T1 (20.89 n rest o 20.04	ving m (s	Jun 0.61 www.step 20.98 velling 20.05	Jul 0.45 os 3 to 7 21 from Ta 20.05	A 0 7 in T 20 able 9	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04	20.6	65 04	0.99	19.9)1	21	(86)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99	during heater for gair Feb 0.99 temperate 20.11 20.02 tor for gair 0.99	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of do	n the livea, h1,1 May 0.8 ea T1 (20.89 n rest o 20.04 welling 0.75	ving m (s	Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53	Jul 0.45 os 3 to 7 21 from Ta 20.05 e Table 0.35	A 0.7 in T 20.8 ble 9 20.9 9a) 0.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04	20.6	65 004	20.24	19.9)1	21	(86) (87) (88)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact	during heater for gair Feb 0.99 temperate 20.11 constant for gair 0.99 temperate temperate	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of do	n the livea, h1,1 May 0.8 ea T1 (20.89 n rest o 20.04 welling 0.75	ving m (s / l l l l l l l l l l l l l l l l l l	Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53	Jul 0.45 os 3 to 7 21 from Ta 20.05 e Table 0.35	A 0.7 in T 20.8 ble 9 20.9 9a) 0.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal	20.6	05 65 004 03	20.24	19.9	91	21	(86) (87) (88)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal	during heater for gair Feb 0.99 temperate 20.11 constant for gair 0.99 temperate temperate	ns for li Mar 0.98 ure in li 20.36 ating per 20.02 ns for re 0.97 ure in t	eriods ir ving are Apr 0.92 iving are 20.67 eriods ir 20.03 est of do 0.9 he rest	n the lives, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe	ving m (s / l l l l l l l l l l l l l l l l l l	ee Ta Jun 0.61 www.step 20.98 velling 20.05 mm (see 0.53	Jul 0.45 os 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste	A 0 ' in T 20 20 9a) 0 eps 3	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal	20.6 20.6 0.9 0.9 19.6	05 65 04 03)	0.99 20.24 20.03	19.9 20.0	91	21	(86) (87) (88) (89)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62	tor for gair Feb 0.99 temperate 20.11 during hea 20.02 tor for gair 0.99 temperate 18.86	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97 ure in t	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of do 0.9 he rest 19.66	n the livea, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe 19.93	ving m (s	ee Ta Jun 0.61 ow step 20.98 velling 20.05 ,m (se 0.53 T2 (fo	Jul 0.45 0.8 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ster 20.05	A 0. 7 in T 20. 8 ble 9 20. 9a) 0. eps 3	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20	0.9 20.6 20.6 0.9 0.9 19.6 fLA = I	05 65 04 03)	0.99 20.24 20.03 0.99	19.9 20.0	91		(86) (87) (88) (89)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62	during heater for gair Feb 0.99 temperate 0.99 temperate 18.86 temperate 18.86	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97 ure in t 19.23 ure (for	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of dr 0.9 he rest 19.66	n the lives, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe 19.93	ving m (s / / / / / / / / / / / / / / / / / /	ee Ta Jun 0.61 ow step 20.98 velling 20.05 ,m (se 0.53 T2 (fc 20.04	Jul 0.45 0s 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste 20.05	A 0. in T 20. bble 9 20. 9a) 0. eps 3 20.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20 — fLA) × T2	0.9 20.6 20.6 0.9 0.9 19.6 fLA = I	05 65 04 03 65 Livir	0.99 20.24 20.03 0.99 19.06 ng area ÷ (4	19.9 20.0 1 18.5	91		(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62 Mean internal (92)m= 19.09	during heater tor for gair Feb 0.99 temperate 20.11 20.02 tor for gair 0.99 temperate 18.86 temperate 19.31	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97 ure in t 19.23 ure (for	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of do 0.9 he rest 19.66 r the wh 20.02	n the livea, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe 19.93	ving m (s ving follows) / m (s	ee Ta Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53 T2 (fo 20.04 g) = fL	Jul 0.45 0s 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste 20.05 A × T1 20.39	A 0. 7 in T 20. 8ble 9 20. 9a) 0. eps 3 20. + (1 20.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20 — fLA) × T2 39 20.34	0.9 20.6 20.6 0.9 19.6 fLA = I	05 65 04 03 03 Livir	0.99 20.24 20.03 0.99	19.9 20.0	91		(86) (87) (88) (89)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62 Mean internal (92)m= 19.09 Apply adjustm	during heater for gair Feb 0.99 temperate 20.11 considering heater for gair 0.99 temperate 18.86 temperate 19.31 temperate 19.	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97 ure in t 19.23 ure (for	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of dr 0.9 he rest 19.66 r the wh 20.02 internal	the livea, h1,1 May 0.8 ea T1 (20.89 rest of 20.04 welling 0.75 of dwe 19.93 ole dw 20.27 tempe	ving m (s	ee Ta Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53 T2 (fc 20.04 g) = fL 20.37 ure from	Jul 0.45 os 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste 20.05 A × T1 20.39 m Table	A 0. in T 20. able 9 20. pps 3 20. + (1 20. 4e,	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20 — fLA) × T2 39 20.34 where app	0.9 20.6 20.6 0.9 19.6 fLA = 1 2 20.7 20.7	05 65 04 03 01 01	0.99 20.24 20.03 0.99 19.06 ng area ÷ (4	1 19.9 20.0 1 18.5) =	91 93 96 96		(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62 Mean internal (92)m= 19.09 Apply adjustm (93)m= 19.09	during heat tor for gair Feb 0.99 temperate 20.11 20.02 tor for gair 0.99 temperate 18.86 temperate 19.31 temp	ns for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97 ure in t 19.23 ure (for 19.63	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of do 0.9 he rest 19.66 r the wh 20.02	n the livea, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe 19.93	ving m (s	ee Ta Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53 T2 (fo 20.04 g) = fL	Jul 0.45 0s 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste 20.05 A × T1 20.39	A 0. 7 in T 20. 8ble 9 20. 9a) 0. eps 3 20. + (1 20.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20 — fLA) × T2 39 20.34 where app	0.9 20.6 20.6 0.9 19.6 fLA = I	05 65 04 03 01 01	0.99 20.24 20.03 0.99 19.06 ng area ÷ (4	19.9 20.0 1 18.5	91 93 96 96		(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62 Mean internal (92)m= 19.09 Apply adjustm (93)m= 19.09 8. Space hear	during heater for gair Feb 0.99 temperate 20.11 20.02 20.02 tor for gair 0.99 temperate 18.86 temperate 19.31 tent to the 19.31 ting require	ating pens for li Mar 0.98 ure in li 20.36 ating pe 20.02 ns for re 0.97 ure in ti 19.23 ure (for 19.63 emean 19.63	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of dr 0.9 he rest 19.66 r the wh 20.02 internal 20.02	n the lives, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe 19.93 ole dw 20.27 temper 20.27	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53 T2 (fc 20.04 g) = fL 20.37 ure from 20.37	Jul 0.45 0s 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste 20.05 A × T1 20.39 m Table 20.39	A O. in T 20. ble 9 20. ps 3 20. + (1 20. 4e, 20.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20 − fLA) × T2 39 20.34 where app 39 20.34	0.9 20.6 20.6 0.9 19.6 fLA = 1 20.6 20.6	04 03 03 01 01 01	0.99 20.24 20.03 0.99 19.06 ng area ÷ (4) 19.48	19.9 20.0 1 18.5) =	91 93 96 96 96	0.36	(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 1 Mean internal (87)m= 19.94 Temperature (88)m= 20.02 Utilisation fact (89)m= 0.99 Mean internal (90)m= 18.62 Mean internal (92)m= 19.09 Apply adjustm (93)m= 19.09	temperate 20.02 2 tor for gair 0.99 temperate 18.86 temperate 19.31 temperate	ating pens for li Mar 0.98 ure in li 20.36 ating pe 20.02 urs for re 0.97 ure in ti 19.23 ure (for 19.63 emean 19.63 ement nal term	eriods in ving are Apr 0.92 iving are 20.67 eriods in 20.03 est of do 0.9 he rest 19.66 r the who 20.02 internal 20.02 internal 20.02	the lives, h1,1 May 0.8 ea T1 (20.89 n rest of 20.04 welling 0.75 of dwe 19.93 ole dw 20.27 tempe 20.27 re obta	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta Jun 0.61 ow step 20.98 velling 20.05 m (se 0.53 T2 (fc 20.04 g) = fL 20.37 ure from 20.37	Jul 0.45 0s 3 to 7 21 from Ta 20.05 e Table 0.35 ollow ste 20.05 A × T1 20.39 m Table 20.39	A O. in T 20. ble 9 20. ps 3 20. + (1 20. 4e, 20.	ug Sep 5 0.75 Table 9c) 99 20.94 9, Th2 (°C) 05 20.04 4 0.67 to 7 in Tal 05 20 − fLA) × T2 39 20.34 where app 39 20.34	0.9 20.6 20.6 0.9 19.6 fLA = 1 20.6 20.6	04 03 03 01 01 01	0.99 20.24 20.03 0.99 19.06 ng area ÷ (4) 19.48	19.9 20.0 1 18.5) =	91 93 96 96 96	0.36	(86) (87) (88) (89) (90) (91)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilisation factor for gains, hm:	0.42	0.7	0.00	0.00	0.00		(94)
(94)m= 0.99 0.98 0.96 0.9 0.76 0.55 0.39 Useful gains, hmGm , W = (94)m x (84)m	0.43	0.7	0.93	0.98	0.99		(94)
	317.17 4	472.74	553.44	522.28	503.82		(95)
Monthly average external temperature from Table 8		<u>I</u>			<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 [[(93)m- ((96)m]					
		503.35	765.78	1013.75	1223.06		(97)
Space heating requirement for each month, kWh/month = 0.024		`` i					
(98)m= 520.43 391.91 305.87 148.43 48.22 0 0	0	0	157.98	353.86	535.12		(00)
	l otal pe	er year (kWh/year) = Sum(9	8) _{15,912} =	2461.81	(98)
Space heating requirement in kWh/m²/year						31.93	(99)
9b. Energy requirements – Community heating scheme							
This part is used for space heating, space cooling or water heatin Fraction of space heat from secondary/supplementary heating (Ta				unity sch	neme.	0	(301)
	abic 11)	O II IIC	лю		[
Fraction of space heat from community system 1 – (301) =						1	(302)
The community scheme may obtain heat from several sources. The procedure all includes boilers, heat pumps, geothermal and waste heat from power stations. Se			p to tour (other heat	sources; ti	ne latter	
Fraction of heat from Community heat pump						1	(303a)
Fraction of total space heat from Community heat pump			(3	02) x (303	a) =	1	(304a)
Factor for control and charging method (Table 4c(3)) for commun	nity hootin		0.000		i	_	= (
r deter for definite and ending method (above 16(e)) for definition	iity neatii	ng syst	em			1	(305)
Distribution loss factor (Table 12c) for community heating system	-	ng syst	em			1.05	(305)
	-	ng syst	em		[(306)
Distribution loss factor (Table 12c) for community heating system	-	ng syst	em			1.05	(306)
Distribution loss factor (Table 12c) for community heating system Space heating	1			5) x (306) :	 -	1.05 kWh/y e	(306)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement) (9	98) x (30	4a) x (305		 -	1.05 kWh/y e 2461.81	(306)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump	(9 n Table 4	98) x (30 la or Ap	4a) x (305	E)	 - 	1.05 kWh/y 6 2461.81 2584.9	(306) ear (307a)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system)	(9 n Table 4	98) x (30 la or Ap	4a) x (309 opendix	E)	=	1.05 kWh/y 6 2461.81 2584.9	(306) ear (307a) (308
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from	(9 n Table 4	98) x (30 la or Ap	4a) x (309 opendix	E)	=	1.05 kWh/y 6 2461.81 2584.9	(306) ear (307a) (308
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating	(9 n Table 4	98) x (30 la or Ap 98) x (30	4a) x (305 opendix 1) x 100 -	E)		1.05 kWh/y 0 2461.81 2584.9 0	(306) ear (307a) (308
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme:	(9 n Table 4: em (9	98) x (30 la or Ap 98) x (30 64) x (30	4a) x (305 opendix 1) x 100 - 3a) x (305	E) - (308) =	=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92	(306) ear (307a) (308 (309)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump	(9 n Table 4: em (9	98) x (30 la or Ap 98) x (30 64) x (30	4a) x (305 opendix 1) x 100 - 3a) x (305	E) - (308) = - (306) :	=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92 2192.31	(306) ear (307a) (308 (309)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution	(9 n Table 4 em (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30	4a) x (305 opendix 1) x 100 + 3a) x (305 (307e) +	E) - (308) = - (306) :	=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92 2192.31 47.77	(306) ear (307a) (308 (309) (310a) (313)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio	(9 n Table 4: em (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 + 3a) x (305 (307e) +	E) - (308) = - (306) :	=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92 2192.31 47.77 0	(306) ear (307a) (308 (309) (310a) (313) (314)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f):	(9 n Table 4: em (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 + 3a) x (305 (307e) +	E) - (308) = - (306) :	=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92 2192.31 47.77 0	(306) ear (307a) (308 (309) (310a) (313) (314) (315)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from or	(9 n Table 4: em (9 (6 0.01 × [98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 + 3a) x (305 (307e) +	E) - (308) = - (306) :	=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92 2192.31 47.77 0 0 202.28	(306) ear (307a) (308 (309) (310a) (313) (314) (315) (330a)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from or warm air heating system fans	(9 n Table 4: em (9 0.01 × [=	98) x (30 la or Ap 98) x (30 64) x (30 [(307a)	4a) x (305 opendix 1) x 100 + 3a) x (305 (307e) +	E) - (308) = - (308) = - (306) : - (310a)(=	1.05 kWh/ye 2461.81 2584.9 0 0 2087.92 2192.31 47.77 0 0 202.28 0	(306) ear (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b)

(332)Energy for lighting (calculated in Appendix L) 335.82 Total delivered energy for all uses (307) + (309) + (310) + (312) + (315) + (331) + (332)...(237b) =5315.31 (338)12b. CO2 Emissions – Community heating scheme **Emission factor Emissions Energy** kWh/year kg CO2/kWh kg CO2/year CO2 from other sources of space and water heating (not CHP) If there is CHP using two fuels repeat (363) to (366) for the second fuel Efficiency of heat source 1 (%) (367a) 383 CO2 associated with heat source 1 $[(307b)+(310b)] \times 100 \div (367b) \times$ (367)647.36 0.52 Electrical energy for heat distribution [(313) x (372)0.52 24.79 Total CO2 associated with community systems (363)...(366) + (368)...(372)(373)672.15 CO2 associated with space heating (secondary) (309) x (374)0 0 CO2 associated with water from immersion heater or instantaneous heater (312) x 0.22 (375)0 Total CO2 associated with space and water heating (373) + (374) + (375) =(376)672.15 CO2 associated with electricity for pumps and fans within dwelling (331)) x (378)0.52 104.98 CO2 associated with electricity for lighting (332))) x 0.52 174.29 (379)sum of (376)...(382) =Total CO2, kg/year (383)951.42 **Dwelling CO2 Emission Rate** $(383) \div (4) =$ (384)12.34

El rating (section 14)

(385)

89.56

		Hee	er Details:						
A Nome -	Day Tallayet	USE		- M	I		CTDO	000000	
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012	>	Stroma Softwa					036639 on: 1.0.5.17	
Contware realise.	0.101110 1 07 11 2012		rty Address:		31011.		V 01010		
Address :		·	•						
1. Overall dwelling dime	ensions:								
Ground floor		<u>_</u>	rea(m²)	(10) v		ight(m)	(2a) =	Volume(m ³	(3a)
	a) . (4 b) . (4 a) . (4 d) . (4 a)	. (45)		(1a) x	2	.82	(2a) =	217.45	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)	+(1n)	77.11	(4)	\	I) (O)	(0.)		_
Dwelling volume				(3a)+(3b))+(3c)+(3c	d)+(3e)+	.(3n) =	217.45	(5)
2. Ventilation rate:	main se	condary	other		total			m³ per hou	ır
Number of alligners	heating he	eating		1 _ F			40 =		_
Number of chimneys			0] = [0			0	(6a)
Number of open flues	0 +	0 +	0] = [0		20 =	0	(6b)
Number of intermittent fa				Ĺ	3		10 =	30	(7a)
Number of passive vents	3			L	0	X '	10 =	0	(7b)
Number of flueless gas f	ires				0	X 4	40 =	0	(7c)
							Air ch	anges per ho	our
Infiltration due to chimne	vs_flues and fans = (6a)+(6b)+(7a)+(7l	o)+(7c) =	Г	30		÷ (5) =	0.14	(8)
	peen carried out or is intended			ontinue fr			. (0) –	0.14	(0)
Number of storeys in t	he dwelling (ns)							0	(9)
Additional infiltration						[(9)	-1]x0.1 =	0	(10)
	.25 for steel or timber for steel, use the value corresp			•	uction			0	(11)
deducting areas of openi		onaing to the g	realer wall are	a (aner					
If suspended wooden	floor, enter 0.2 (unseale	ed) or 0.1 (se	ealed), else	enter 0				0	(12)
If no draught lobby, en	ter 0.05, else enter 0							0	(13)
· ·	s and doors draught str	ipped						0	(14)
Window infiltration			0.25 - [0.2					0	(15)
Infiltration rate			(8) + (10)					0	(16)
•	q50, expressed in cubi	•	•	•	etre of e	envelope	area	5	(17)
If based on air permeabil	es if a pressurisation test has				is heina u	sad		0.39	(18)
Number of sides sheltere		boon done or d	acgree an per	modelinty	io boiling a	50 u		2	(19)
Shelter factor			(20) = 1 -	0.075 x (1	19)] =			0.85	(20)
Infiltration rate incorpora	ting shelter factor		(21) = (18)	x (20) =				0.33	(21)
Infiltration rate modified f	or monthly wind speed						•		
Jan Feb	Mar Apr May	Jun Ju	ıl Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed from Table 7								
(22)m= 5.1 5	4.9 4.4 4.3	3.8 3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2	2\m ÷ 4								
$\frac{\text{Virid Factor (22a)iii} = (22a)\text{m}}{1.27} = 1.25$	1.23 1.1 1.08	0.95 0.9	5 0.92	1	1.08	1.12	1.18		
` '								J	

0.42 0.41 0.4 0.36 0.35 0.31 0.31 0.31 0.33 0.35 0.37 0.39 Calculate effective air change rate for the applicable case If mechanical ventilation: If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a) If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =
If mechanical ventilation: If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)) , otherwise (23b) = (23a) If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) = a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) x [1 - (23c) ÷ 100] (24a)m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a) 0 (25)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) = a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) × [1 - (23c) ÷ 100] (24a)m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) x [1 - (23c) ÷ 100] (24a)m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(24a)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
b) If balanced mechanical ventilation without heat recovery (MV) (24b)m = (22b)m + (23b) (24b)m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(24b)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
c) If whole house extract ventilation or positive input ventilation from outside if (22b)m < 0.5 × (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 × (23b) (24c)m = 0
if (22b)m < 0.5 x (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 x (23b) (24c)m = 0
(24c)m=
if (22b)m = 1, then (24d)m = (22b)m otherwise (24d)m = 0.5 + [(22b)m² x 0.5] (24d)m= 0.59
if (22b)m = 1, then (24d)m = (22b)m otherwise (24d)m = 0.5 + [(22b)m² x 0.5] (24d)m = 0.59
Effective air change rate - enter (24a) or (24b) or (24c) or (24d) in box (25) (25)m= 0.59 0.58 0.58 0.57 0.56 0.55 0.55 0.55 0.55 0.56 0.57 0.58 3. Heat losses and heat loss parameter: ELEMENT Gross area (m²) Openings Met Area A, m² W/m2K (W/K) kJ/m²-K kJ/K Doors 2.52 x 1 = 2.52 Windows Type 1 2.48 x1/[1/(1.4)+0.04] = 3.29 Windows Type 2 4.65 x1/[1/(1.4)+0.04] = 6.16 Windows Type 3 1.7 x1/[1/(1.4)+0.04] = 2.25 Windows Type 4 0.77 x1/[1/(1.4)+0.04] = 1.02 Windows Type 5 0.53 x1/[1/(1.4)+0.04] = 0.7
(25)m= 0.59 0.58 0.58 0.57 0.56 0.55 0.55 0.55 0.56 0.57 0.58 3. Heat losses and heat loss parameter: ELEMENT Gross Openings area (m²) m² Net Area M, m² U-value W/m2K A X U K, Value W/m2K A X k K, J/K Doors 2.52 x 1 = 2.52 (26 Windows Type 1 2.48 x1/[1/(1.4) + 0.04] = 3.29 (27 Windows Type 2 4.65 x1/[1/(1.4) + 0.04] = 6.16 (27 Windows Type 3 1.7 x1/[1/(1.4) + 0.04] = 2.25 (27 Windows Type 4 0.77 x1/[1/(1.4) + 0.04] = 1.02 (27 Windows Type 5 0.53 x1/[1/(1.4) + 0.04] = 0.7 0.7
3. Heat losses and heat loss parameter: ELEMENT Gross area (m²) Openings m² Net Area A , m² U-value W/m2K A X U (W/K) k-value kJ/m²-K A X k kJ/K Doors 2.52 x 1 = 2.52 (26 Windows Type 1 2.48 x1/[1/(1.4) + 0.04] = 3.29 (27 Windows Type 2 4.65 x1/[1/(1.4) + 0.04] = 6.16 (27 Windows Type 3 1.7 x1/[1/(1.4) + 0.04] = 2.25 (27 Windows Type 4 0.77 x1/[1/(1.4) + 0.04] = 1.02 (27 Windows Type 5 0.53 x1/[1/(1.4) + 0.04] = 0.7 (27
ELEMENT Gross area (m²) Openings m² Net Area A ,m² U-value W/m2K A X U (W/K) k-value kJ/m²-K A X k kJ/K Doors 2.52 x 1 = 2.52 (26 Windows Type 1 2.48 x1/[1/(1.4) + 0.04] = 3.29 (27 Windows Type 2 4.65 x1/[1/(1.4) + 0.04] = 6.16 (27 Windows Type 3 1.7 x1/[1/(1.4) + 0.04] = 2.25 (27 Windows Type 4 0.77 x1/[1/(1.4) + 0.04] = 1.02 (27 Windows Type 5 0.53 x1/[1/(1.4) + 0.04] = 0.7 (27
ELEMENT Gross area (m²) Openings m² Net Area A ,m² U-value W/m2K A X U (W/K) k-value kJ/m²-K A X k kJ/K Doors 2.52 x 1 = 2.52 (26 Windows Type 1 2.48 x1/[1/(1.4) + 0.04] = 3.29 (27 Windows Type 2 4.65 x1/[1/(1.4) + 0.04] = 6.16 (27 Windows Type 3 1.7 x1/[1/(1.4) + 0.04] = 2.25 (27 Windows Type 4 0.77 x1/[1/(1.4) + 0.04] = 1.02 (27 Windows Type 5 0.53 x1/[1/(1.4) + 0.04] = 0.7 0.7
Windows Type 1 $ 2.48 $
Windows Type 2 4.65 $x1/[1/(1.4) + 0.04] = 6.16$ (27) Windows Type 3 1.7 $x1/[1/(1.4) + 0.04] = 2.25$ (27) Windows Type 4 0.77 $x1/[1/(1.4) + 0.04] = 1.02$ (27) Windows Type 5 0.53 $x1/[1/(1.4) + 0.04] = 0.7$ (27)
Windows Type 3
Windows Type 4 $0.77 x1/[1/(1.4) + 0.04] = 1.02$ Windows Type 5 $0.53 x1/[1/(1.4) + 0.04] = 0.7$ (27)
Windows Type 5
Windows Type 5
Windows Type 6 $1.7 $
Windows Type 7 $0.77 $
Windows Type 8
Walls Type 1 76.47 19.29 57.18 × 0.18 = 10.29 (25)
Wells To a Company of the Company of
Roof 77.11 0 77.11 x 0.13 = 10.02
Total area of elements m ²
Total area of elements, m ² * for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions
* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions
* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions [26] (26) (20) + (23) = (26) (20) + (26) (20) = (26) (20) = (26) (20
* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions Fabric heat loss, W/K = S (A x U) (26)(30) + (32) = 50.19

		1-11-dl-											
can be used instead Thermal bridge				usina An	nandiy l	K						44.00	7(26)
if details of therma	,	,			•							11.33	(36)
Total fabric he	0 0	aro not ni	om (00) -	- 0.00 % (0	'/			(33) +	(36) =			61.52	(37)
Ventilation hea	at loss ca	alculated	l monthly	y				(38)m	= 0.33 × (25)m x (5)			
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 42.22	41.98	41.73	40.6	40.39	39.4	39.4	39.22	39.78	40.39	40.82	41.27		(38)
Heat transfer of	coefficier	nt, W/K				•	•	(39)m	= (37) + (37)	38)m		•	
(39)m= 103.74	103.5	103.25	102.12	101.91	100.92	100.92	100.74	101.3	101.91	102.34	102.79		
Heat loss para	meter (H	HLP), W/	m²K						Average = = (39)m ÷		12 /12=	102.12	(39)
(40)m= 1.35	1.34	1.34	1.32	1.32	1.31	1.31	1.31	1.31	1.32	1.33	1.33		
Number of day	s in moi	nth (Tab	le 1a)						Average =	Sum(40) ₁	12 /12=	1.32	(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 heat	ting ener	rgy requi	irement:								kWh/ye	ear:	
Assumed occu	inancy I	N								2	41		(42)
if TFA > 13.9 if TFA £ 13.9	9, N = 1		[1 - exp	(-0.0003	849 x (TF	FA -13.9)2)] + 0.0	0013 x (TFA -13.	.9)	41		(42)
Annual averag	e hot wa										.34		(43)
Reduce the annua not more that 125	_				_	_	to achieve	a water us	se target o	f		•	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec													
Hot water usage ii								Seb	Oct	INOV	Dec		
(44)m= 100.47	96.82	93.16	89.51	85.86	82.2	82.2	85.86	89.51	93.16	96.82	100.47		
` ,						ļ			I Total = Su	<u>I</u> m(44) ₁₁₂ =	<u> </u>	1096.04	(44)
Energy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	m x nm x E	OTm / 3600	kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		_
(45)m= 148.99	130.31	134.47	117.23	112.49	97.07	89.95	103.22	104.45	121.73	132.87	144.29		_
If instantaneous w	ator hoatii	na at noint	of use (no	hot water	r storage)	enter () in	hoves (16		Total = Su	m(45) ₁₁₂ =	=	1437.08	(45)
			·		· · ·		` ′		10.00	10.02	24.64	1	(46)
(46)m= 22.35 Water storage	19.55 loss:	20.17	17.59	16.87	14.56	13.49	15.48	15.67	18.26	19.93	21.64		(46)
Storage volum		includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		150		(47)
If community h	eating a	ınd no ta	ınk in dw	elling, e	nter 110) litres in	(47)						
Otherwise if no		hot wate	er (this in	icludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (47)			
Water storage		ا لم معمام	ft-	ممادة	/1.\^/1	- /-l -> -\ .						1	(10)
a) If manufact				JI IS KIIO	WII (KVVI	i/day).					39		(48)
Temperature for				201			(40) × (40)				54		(49)
Energy lost fro b) If manufact		_	-		or is not		(48) x (49)	· =		0.	75		(50)
Hot water stora			-								0		(51)
If community h	_		on 4.3									· I	
Volume factor Temperature factor			2h								0		(52)
romperature in	40101 IIU	iii Table	20								0		(53)

Figure 1 and figure contagnations are 120/16/15	(47) (54) (50) (50)		1
Energy lost from water storage, kWh/year Enter (50) or (54) in (55)	$(47) \times (51) \times (52) \times (53) =$	0	(54)
Water storage loss calculated for each month	$((56)m = (55) \times (41)m$	0.75	(55)
	. , . , . ,	1 00 50 1 00 00	1 (50)
(56)m= 23.33 21.07 23.33 22.58 23.33 22.58 23.33 [50] If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷		22.58 23.33 (H11) is from Append	(56)
		 	1
(57)m= 23.33 21.07 23.33 22.58 23.33 22.58 23.33	3 23.33 22.58 23.33	22.58 23.33	(57)
Primary circuit loss (annual) from Table 3		0	(58)
Primary circuit loss calculated for each month (59)m = (58) ÷	` '	actat)	
(modified by factor from Table H5 if there is solar water heat (59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26	 	22.51 23.26	(59)
` '		22.01 20.20] (63)
Combi loss calculated for each month (61)m = (60) \div 365 x (4	i i i i		1 (64)
(61)m= 0 0 0 0 0 0 0	0 0 0	0 0	(61)
Total heat required for water heating calculated for each mon		ì i i i	ı`´´
(62)m= 195.59 172.4 181.06 162.33 159.08 142.16 136.5		<u> </u>	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quan		tion to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see A	`i i -] (63)
(63)m= 0 0 0 0 0 0 0	0 0 0	0 0	(63)
Output from water heater		T T	1
(64)m= 195.59 172.4 181.06 162.33 159.08 142.16 136.5			(64)
	Output from water heate	,	1985.69 (64)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)	<u> </u>	1 	1
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18	3 71.6 70.8 77.75	80.25 85.25	(65)
	3 71.6 70.8 77.75	80.25 85.25	(65)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18	3 71.6 70.8 77.75	80.25 85.25	(65)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	71.6 70.8 77.75 e dwelling or hot water is t	80.25 85.25 From community h	(65)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	71.6 70.8 77.75 e dwelling or hot water is to Aug Sep Oct	80.25 85.25 From community Programmed Nov Dec	(65) neating
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 </td <td>Aug Sep Oct 9 120.29 120.29 120.29</td> <td>80.25 85.25 From community h</td> <td>(65)</td>	Aug Sep Oct 9 120.29 120.29 120.29	80.25 85.25 From community h	(65)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 120.29 120.29 120.29 120.29 120.29 120.29 Lighting gains (calculated in Appendix L, equation L9 or L9a)	Aug Sep Oct 9 120.29 120.29 , also see Table 5	80.25 85.25 From community I	(65) neating (66)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 </td <td>Aug Sep Oct 9 120.29 120.29 12.38 15.72</td> <td>80.25 85.25 From community Programmed Nov Dec</td> <td>(65) neating</td>	Aug Sep Oct 9 120.29 120.29 12.38 15.72	80.25 85.25 From community Programmed Nov Dec	(65) neating
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 </td <td>Aug Sep Oct 9 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5</td> <td>80.25 85.25 From community I</td> <td>(65) neating (66)</td>	Aug Sep Oct 9 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5	80.25 85.25 From community I	(65) neating (66)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 </td <td>Aug Sep Oct 9 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5</td> <td>80.25 85.25 From community I</td> <td>(65) neating (66)</td>	Aug Sep Oct 9 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5	80.25 85.25 From community I	(65) neating (66)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the include (57)m in calculation of (65)m only if cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylinder in the first cylinder is in the first cylinder in the first cylin	Aug Sep Oct 9 120.29 120.29 120.29 120.29 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5	80.25 85.25 From community Nov Dec 120.29 120.29	(65) neating (66) (67)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 </td <td>Aug Sep Oct 9 120.29 120.29 120.29 120.29 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5</td> <td>80.25 85.25 From community Nov Dec 120.29 120.29</td> <td>(65) neating (66) (67)</td>	Aug Sep Oct 9 120.29 120.29 120.29 120.29 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5	80.25 85.25 From community Nov Dec 120.29 120.29	(65) neating (66) (67)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the include (57)m in calculation of (65)m only if cylinder is in the include (57)m in calculated in Sand Sand Sand Sand Sand Sand Sand San	Aug Sep Oct 9 120.29 120.29 120.29 120.29 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5	80.25 85.25 From community Irrom c	(65) neating (66) (67) (68)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 </td <td>Aug Sep Oct 9 120.29 120.29 120.29 120.29 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5</td> <td>80.25 85.25 From community Irrom c</td> <td>(65) neating (66) (67) (68)</td>	Aug Sep Oct 9 120.29 120.29 120.29 120.29 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5	80.25 85.25 From community Irrom c	(65) neating (66) (67) (68)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the final state of the first	Aug Sep Oct 9 120.29 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5 3 35.03 35.03 35.03	Nov Dec 120.29 18.35 19.56 189.8 203.88 35.03 35.03	(65) neating (66) (67) (68) (69)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the include (57)m in calculation of (65)m only if cylinder is in the final include (57)m in calculation of (65)m only if cylinder is in the final include in the included	Aug Sep Oct 9 120.29 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5 3 35.03 35.03 35.03	Nov Dec 120.29 18.35 19.56 189.8 203.88 35.03 35.03	(65) neating (66) (67) (68) (69)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the include (57)m in calculation of (65)m only if cylinder is in the final include (57)m in calculation of (65)m only if cylinder is in the final include (57)m only if cylinder is in the final include (57)m only if cylinder is in the final include (57)m only if cylinder is in the final included (57)m only if cylinder is in the final included (57)m only if cylinder is in the final included (57)m only if cylinder is in the final included (58)m. Jan Feb Mar Apr May Jun Jul (66)m= 120.29	Aug Sep Oct 9 120.29 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5 3 35.03 35.03 35.03	Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 3 3 3	(65) neating (66) (67) (68) (69) (70)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the final pains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 120.29 120.	Aug Sep Oct 9 120.29 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5 3 35.03 35.03 35.03 3 -96.23 -96.23 -96.23	Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 3 3 3	(65) neating (66) (67) (68) (69) (70)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the final state of the first	Aug Sep Oct 9 120.29 120.29 120.29 , also see Table 5 9.22 12.38 15.72 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5 3 35.03 35.03 35.03 3 -96.23 -96.23 -96.23	Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 3 3 3 3 3 3 111.46 114.59	(65) neating (66) (67) (68) (69) (70) (71)
(65)m= 86.82 77 81.99 75.05 74.68 68.35 67.18 include (57)m in calculation of (65)m only if cylinder is in the final state of the first	Aug Sep Oct 9 120.29 120.29 120.29 9 120.29 120.29 120.29 9 120.29 12.38 15.72 13a), also see Table 5 7 157.36 162.93 174.81 5a), also see Table 5 3 35.03 35.03 35.03 3 3 3 3 -96.23 -96.23 -96.23 96.23 98.34 104.5 7)m + (68)m + (69)m + (70)m + (Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 3 3 3 3 3 3 111.46 114.59	(65) neating (66) (67) (68) (69) (70) (71)

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

Orientation: Access Factor Table 6d	•	Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast 0.9x 0.77	x	1.7	x	11.28	x	0.63	x	0.7	=	5.86	(75)
Northeast _{0.9x} 0.77	x	1.7	x	22.97	x	0.63	x	0.7	=	11.93	(75)
Northeast 0.9x 0.77	x	1.7	x	41.38	x	0.63	x	0.7	=	21.5	(75)
Northeast _{0.9x} 0.77	x	1.7	x	67.96	x	0.63	x	0.7] =	35.31	(75)
Northeast _{0.9x} 0.77	x	1.7	x	91.35	x	0.63	x	0.7	=	47.46	(75)
Northeast 0.9x 0.77	x	1.7	x	97.38	x	0.63	x	0.7	=	50.6	(75)
Northeast _{0.9x} 0.77	x	1.7	x	91.1	X	0.63	X	0.7	=	47.33	(75)
Northeast _{0.9x} 0.77	x	1.7	x	72.63	x	0.63	X	0.7	=	37.73	(75)
Northeast _{0.9x} 0.77	x	1.7	x	50.42	x	0.63	x	0.7	=	26.2	(75)
Northeast _{0.9x} 0.77	x	1.7	x	28.07	X	0.63	X	0.7	=	14.58	(75)
Northeast _{0.9x} 0.77	x	1.7	x	14.2	x	0.63	X	0.7	=	7.38	(75)
Northeast _{0.9x} 0.77	x	1.7	x	9.21	x	0.63	x	0.7	=	4.79	(75)
Southeast 0.9x 0.77	x	2.48	x	36.79	x	0.63	x	0.7	=	27.89	(77)
Southeast 0.9x 0.77	x	4.65	x	36.79	x	0.63	x	0.7	=	52.29	(77)
Southeast 0.9x 0.77	x	2.48	x	62.67	x	0.63	x	0.7	=	47.5	(77)
Southeast 0.9x 0.77	x	4.65	x	62.67	x	0.63	X	0.7	=	89.07	(77)
Southeast 0.9x 0.77	x	2.48	x	85.75	x	0.63	x	0.7	=	64.99	(77)
Southeast 0.9x 0.77	x	4.65	x	85.75	x	0.63	x	0.7	=	121.86	(77)
Southeast 0.9x 0.77	x	2.48	X	106.25	X	0.63	X	0.7	=	80.53	(77)
Southeast 0.9x 0.77	x	4.65	x	106.25	x	0.63	x	0.7	=	150.99	(77)
Southeast 0.9x 0.77	x	2.48	x	119.01	x	0.63	x	0.7	=	90.2	(77)
Southeast 0.9x 0.77	x	4.65	X	119.01	X	0.63	X	0.7	=	169.13	(77)
Southeast 0.9x 0.77	x	2.48	x	118.15	x	0.63	x	0.7	=	89.55	(77)
Southeast 0.9x 0.77	x	4.65	x	118.15	x	0.63	x	0.7	=	167.9	(77)
Southeast 0.9x 0.77	x	2.48	x	113.91	x	0.63	x	0.7	=	86.33	(77)
Southeast 0.9x 0.77	x	4.65	x	113.91	x	0.63	x	0.7	=	161.88	(77)
Southeast 0.9x 0.77	x	2.48	x	104.39	X	0.63	x	0.7	=	79.12	(77)
Southeast 0.9x 0.77	x	4.65	x	104.39	X	0.63	x	0.7	=	148.35	(77)
Southeast 0.9x 0.77	x	2.48	x	92.85	X	0.63	X	0.7	=	70.37	(77)
Southeast 0.9x 0.77	x	4.65	x	92.85	X	0.63	X	0.7	=	131.95	(77)
Southeast 0.9x 0.77	x	2.48	X	69.27	X	0.63	X	0.7	=	52.5	(77)
Southeast 0.9x 0.77	x	4.65	x	69.27	X	0.63	X	0.7	=	98.44	(77)
Southeast 0.9x 0.77	x	2.48	x	44.07	x	0.63	x	0.7	=	33.4	(77)
Southeast 0.9x 0.77	x	4.65	x	44.07	x	0.63	x	0.7	=	62.63	(77)
Southeast 0.9x 0.77	x	2.48	x	31.49	x	0.63	x	0.7	=	23.87	(77)
Southeast 0.9x 0.77	X	4.65	x	31.49	x	0.63	x	0.7	=	44.75	(77)
Southwest _{0.9x} 0.77	X	1.7	x	36.79]	0.63	x	0.7] =	19.12	(79)
Southwest _{0.9x} 0.77	X	0.77	x	36.79]	0.63	x	0.7	=	17.32	(79)
Southwest _{0.9x} 0.77	X	1.7	x	62.67		0.63	X	0.7] =	32.56	(79)

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Southwest _{0.9x}	0.77	X	0.77	X	62.67		0.63	X	0.7] =	29.5	(79)
Southwest _{0.9x}	0.77	X	1.7	X	85.75]	0.63	X	0.7] =	44.55	(79)
Southwest _{0.9x}	0.77	X	0.77	X	85.75]	0.63	X	0.7] =	40.36	(79)
Southwest _{0.9x}	0.77	X	1.7	X	106.25		0.63	X	0.7] =	55.2	(79)
Southwest _{0.9x}	0.77	X	0.77	X	106.25		0.63	X	0.7	=	50.01	(79)
Southwest _{0.9x}	0.77	X	1.7	X	119.01		0.63	X	0.7	=	61.83	(79)
Southwest _{0.9x}	0.77	X	0.77	X	119.01		0.63	X	0.7	=	56.01	(79)
Southwest _{0.9x}	0.77	X	1.7	x	118.15		0.63	X	0.7	=	61.38	(79)
Southwest _{0.9x}	0.77	X	0.77	x	118.15		0.63	X	0.7	=	55.61	(79)
Southwest _{0.9x}	0.77	X	1.7	X	113.91		0.63	X	0.7	=	59.18	(79)
Southwest _{0.9x}	0.77	X	0.77	X	113.91		0.63	X	0.7] =	53.61	(79)
Southwest _{0.9x}	0.77	X	1.7	x	104.39]	0.63	X	0.7	=	54.24	(79)
Southwest _{0.9x}	0.77	X	0.77	x	104.39		0.63	X	0.7	=	49.13	(79)
Southwest _{0.9x}	0.77	X	1.7	x	92.85		0.63	X	0.7	=	48.24	(79)
Southwest _{0.9x}	0.77	X	0.77	x	92.85		0.63	x	0.7	=	43.7	(79)
Southwest _{0.9x}	0.77	X	1.7	x	69.27]	0.63	x	0.7	=	35.99	(79)
Southwest _{0.9x}	0.77	X	0.77	x	69.27]	0.63	x	0.7	=	32.6	(79)
Southwest _{0.9x}	0.77	X	1.7	x	44.07		0.63	x	0.7	=	22.9	(79)
Southwest _{0.9x}	0.77	x	0.77	x	44.07		0.63	x	0.7	=	20.74	(79)
Southwest _{0.9x}	0.77	x	1.7	x	31.49		0.63	x	0.7	=	16.36	(79)
Southwest _{0.9x}	0.77	x	0.77	x	31.49		0.63	x	0.7	=	14.82	(79)
Northwest 0.9x	0.77	x	1.7	x	11.28	x	0.63	x	0.7	=	11.72	(81)
Northwest 0.9x	0.77	X	0.77	x	11.28	x	0.63	x	0.7] =	2.66	(81)
Northwest 0.9x	0.77	X	0.53	x	11.28	X	0.63	x	0.7	=	1.83	(81)
Northwest 0.9x	0.77	x	1.7	x	22.97	x	0.63	x	0.7	=	23.86	(81)
Northwest 0.9x	0.77	x	0.77	x	22.97	x	0.63	x	0.7	=	5.4	(81)
Northwest 0.9x	0.77	X	0.53	x	22.97	X	0.63	x	0.7	=	3.72	(81)
Northwest 0.9x	0.77	x	1.7	x	41.38	x	0.63	x	0.7	=	43	(81)
Northwest 0.9x	0.77	x	0.77	x	41.38	x	0.63	x	0.7	=	9.74	(81)
Northwest 0.9x	0.77	X	0.53	x	41.38	x	0.63	x	0.7	=	6.7	(81)
Northwest 0.9x	0.77	x	1.7	x	67.96	x	0.63	x	0.7	=	70.61	(81)
Northwest 0.9x	0.77	x	0.77	x	67.96	x	0.63	x	0.7	=	15.99	(81)
Northwest 0.9x	0.77	X	0.53	x	67.96	x	0.63	x	0.7	=	11.01	(81)
Northwest _{0.9x}	0.77	x	1.7	x	91.35	x	0.63	x	0.7	=	94.92	(81)
Northwest _{0.9x}	0.77	x	0.77	x	91.35	x	0.63	x	0.7] =	21.5	(81)
Northwest _{0.9x}	0.77	x	0.53	x	91.35	x	0.63	x	0.7	j =	14.8	(81)
Northwest _{0.9x}	0.77	x	1.7	x	97.38	x	0.63	x	0.7] =	101.19	(81)
Northwest _{0.9x}	0.77	x	0.77	x	97.38	x	0.63	x	0.7	j =	22.92	(81)
Northwest _{0.9x}	0.77	j×	0.53	x	97.38	x	0.63	x	0.7	j =	15.77	(81)
Northwest _{0.9x}	0.77	x	1.7	x	91.1	x	0.63	x	0.7	j =	94.66	(81)
Northwest _{0.9x}	0.77	x	0.77	x	91.1	x	0.63	x	0.7	j =	21.44	(81)
_		•		•		•				•		_

Northwest _{0.9x}	0.77	x	0.5	53	X	91.1	x	0.63	x	0.7	=	14.76	(81)
Northwest _{0.9x}	0.77	X	1.7	7	X	72.63	x	0.63	x	0.7	=	75.47	(81)
Northwest _{0.9x}	0.77	X	0.7	7	X	72.63	x	0.63	x	0.7	=	17.09	(81)
Northwest _{0.9x}	0.77	X	0.5	53	X	72.63	x	0.63	x	0.7	=	11.76	(81)
Northwest _{0.9x}	0.77	X	1.7	7	X	50.42	x	0.63	x	0.7	=	52.39	(81)
Northwest _{0.9x}	0.77	X	0.7	7	X	50.42	x	0.63	x	0.7	=	11.87	(81)
Northwest 0.9x	0.77	X	0.5	53	X	50.42	x	0.63	x	0.7	=	8.17	(81)
Northwest _{0.9x}	0.77	X	1.7	7	X	28.07	x	0.63	x	0.7	=	29.16	(81)
Northwest _{0.9x}	0.77	X	0.7	7	X	28.07	x	0.63	x	0.7	=	6.6	(81)
Northwest 0.9x	0.77	X	0.5	53	X	28.07	x	0.63	x	0.7	=	4.55	(81)
Northwest _{0.9x}	0.77	X	1.7	7	X	14.2	x	0.63	x	0.7	=	14.75	(81)
Northwest _{0.9x}	0.77	X	0.7	77	X	14.2	x	0.63	x	0.7	=	3.34	(81)
Northwest _{0.9x}	0.77	X	0.5	53	X	14.2	x	0.63	x	0.7	=	2.3	(81)
Northwest _{0.9x}	0.77	X	1.7	7	X	9.21	x	0.63	x	0.7	=	9.57	(81)
Northwest 0.9x	0.77	x	0.7	77	X	9.21	x	0.63	x	0.7	=	2.17	(81)
Northwest _{0.9x}	0.77	X	0.5	53	X	9.21	x	0.63	×	0.7	=	1.49	(81)
		_											
Solar gains in wa	atts calcul	ated	for eacl	h month	า		(83)n	n = Sum(74)m .	(82)m				
1		2.7	469.65	555.84	$\overline{}$	64.92 539.1	- i		274.42	2 167.44	117.81	1	(83)
Total gains – inte										-]	` '
		3.66	844.44	909.14	Ť	97.48 858.2	_	7.78 728.62	631.54	1 549.13	517.93	1	(84)
(01)1112	002.02		011.11	000.11		071.10		.70 720.02	001.0	. 0 10.10	017.00	j	(= 1)
7. Mean interna	al temperat	ture (heating	seasor	n)								
7. Mean international Temperature de	•	•				area from T	Table 9	, Th1 (°C)				21	(85)
	uring heati	ng pe	eriods ir	the liv	ing			, Th1 (°C)				21	(85)
Temperature d	uring heati	ng pe	eriods ir	the liv	ing n (s		a)	, Th1 (°C)	Oct	Nov	Dec	21	(85)
Temperature d	uring heati or for gains Feb N	ng pe	eriods ir	the livea, h1,n	ing n (s	ee Table 9a	a)	ug Sep	Oct	Nov 0.99	Dec 1	21	(85)
Temperature de Utilisation factor Jan (86)m= 1	uring heati or for gains Feb M 0.99 0.	ng pe for li ⁄lar	eriods ir ving are Apr 0.93	n the liv ea, h1,n May 0.83	ing n (s	ee Table 9a Jun Jul 0.67 0.5	a) A	ug Sep 56 0.8				21	
Temperature de Utilisation factor Jan (86)m= 1 Mean internal t	uring heati or for gains Feb N 0.99 0.99	ng pe for li Mar 98	eriods ir ving are Apr 0.93	n the liv ea, h1,n May 0.83 ea T1 (f	ing n (s	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to	a) A 0.9	ug Sep 56 0.8		0.99		21	
Temperature de Utilisation factor Jan (86)m= 1 Mean internal transporter (87)m= 19.61	or for gains Feb N 0.99 0.99 emperature 19.8 20	ng pe for li //ar 98 e in li	eriods ir ving are Apr 0.93 iving are 20.47	n the livea, h1,n May 0.83 ea T1 (f	ing n (s follo	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99	a) A 0.9 20	ug Sep 56 0.8 able 9c) 98 20.86	0.96	0.99	1	21	(86)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal transporte (87)m= 19.61 Temperature de Control	uring heati or for gains Feb M 0.99 0. emperatur 19.8 20 uring heati	for li far 98 e in li 0.1	eriods ir ving are Apr 0.93 iving are 20.47	n the livea, h1,n May 0.83 ea T1 (f 20.78	ing n (s follo	Jun Jul Jun Jun Jul Jun Jun Jun Jun Jul Jun Jun Jun Jun Jun Jun Jun Jun Jun Jun	A 0.9 0.9 20 Table	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C)	0.96 20.46	0.99	19.57	21	(86)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal transported (87)m= 19.61 Temperature de Control	uring heati or for gains Feb M 0.99 0. emperatur 19.8 20 uring heati	ng pe for li //ar 98 e in li	eriods ir ving are Apr 0.93 iving are 20.47	n the livea, h1,n May 0.83 ea T1 (f	ing n (s follo	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99	A 0.9 0.9 20 Table	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C)	0.96	0.99	1	21	(86)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal transporte (87)m= 19.61 Temperature de Control	uring heati or for gains Feb M 0.99 0. emperatur 19.8 20 uring heati 19.81 19	for li far 98 e in li 0.1 ng pe	eriods ir ving are Apr 0.93 iving are 20.47 eriods ir 19.82	n the livea, h1,n May 0.83 ea T1 (f 20.78 n rest of	n (s	983 19.83	A 0.9 0 7 in 7 9 20 Table 3 19	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C)	0.96 20.46	0.99	19.57	21	(86)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal transporte (87)m= 19.61 Temperature de (88)m= 19.81	uring heati or for gains Feb N 0.99 0.99 emperatur 19.8 20 uring heati 19.81 19 or for gains	for li far 98 e in li 0.1 ng pe	eriods ir ving are Apr 0.93 iving are 20.47 eriods ir 19.82	n the livea, h1,n May 0.83 ea T1 (f 20.78 n rest of	ing (s)	983 19.83	A) O.3 O 7 in 7 9 20 Table 3 19 ple 9a)	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83	0.96 20.46	0.99	19.57	21	(86)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal trong (87)m= 19.61 Temperature de (88)m= 19.81 Utilisation factor (89)m= 0.99	uring heati or for gains Feb N 0.99 0.99 emperatur 19.8 20 uring heati 19.81 19 or for gains 0.99 0.99	for li for li for li for li for re for re	eriods ir ving are Apr 0.93 iving are 20.47 eriods ir 19.82 est of do	n the livea, h1,n May 0.83 ea T1 (f 20.78 n rest of 19.82 welling, 0.78	ing (s)	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Tab 0.57 0.38	A) O.9 O 7 in 7 9 20 Table 3 19 ole 9a) 6 0.6	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83	0.96 20.46 19.82 0.94	0.99 19.96	19.57	21	(86) (87) (88)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal trong (87)m= 19.61 Temperature de (88)m= 19.81 Utilisation factor (89)m= 0.99 Mean internal trong tro	uring heati or for gains Feb N 0.99 0. emperatur 19.8 20 uring heati 19.81 19 or for gains 0.99 0. emperatur	for li for li for li for li for re for re	eriods ir ving are Apr 0.93 iving are 20.47 eriods ir 19.82 est of do	n the livea, h1,n May 0.83 ea T1 (f 20.78 n rest of 19.82 welling, 0.78	follo	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Tab 0.57 0.38	A 0.9 O 7 in 7 P 20 Table 3 19 O .9 Steps 3	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 13 0.72 1 to 7 in Table	0.96 20.46 19.82 0.94	0.99 19.96 19.82 0.99	19.57		(86) (87) (88)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal trong (87)m= 19.61 Temperature de (88)m= 19.81 Utilisation factor (89)m= 0.99 Mean internal trong tro	uring heati or for gains Feb N 0.99 0. emperatur 19.8 20 uring heati 19.81 19 or for gains 0.99 0. emperatur	for li far 98 e in li 0.1 ng pe 81 for re 97 e in t	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest	may the live a, h1,n May 0.83 ea T1 (for 20.78 en rest of 19.82 elling, 0.78 of dwel	follo	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Table 9a 0.57 0.38	A 0.9 O 7 in 7 P 20 Table 3 19 O .9 Steps 3	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 5 to 7 in Table 83 19.73	0.96 20.46 19.82 0.94 le 9c) 19.22	0.99 19.96 19.82 0.99	1 19.57 19.82 1 17.93	21	(86) (87) (88) (89)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal trong (87)m= 19.61 Temperature de (88)m= 19.81 Utilisation factor (89)m= 0.99 Mean internal trong (90)m= 17.98	uring heati or for gains Feb N 0.99 0.9 emperatur 19.8 20 uring heati 19.81 19 or for gains 0.99 0.9 emperatur 18.26 18	for li for li for li for re fo	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22	n the livea, h1,n May 0.83 ea T1 (f 20.78 n rest of 19.82 welling, 0.78 of dwel 19.62	follo follo follo follo	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Tab 0.57 0.38 T2 (follow steps 19.83	A) A 0.9 O 7 in 7 P 20 Table 3 19 Ole 9a) Steps 3 19	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 5 to 7 in Table 83 19.73	0.96 20.46 19.82 0.94 le 9c) 19.22	0.99 19.96 19.82 0.99	1 19.57 19.82 1 17.93		(86) (87) (88) (89)
Temperature de Utilisation factor Jan (86)m= 1	uring heati or for gains Feb N 0.99 0. emperatur 19.8 20 uring heati 19.81 19 or for gains 0.99 0. emperatur 18.26 18	for li for li for li for re fo	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22	n the livea, h1,n May 0.83 ea T1 (f 20.78 n rest of 19.82 welling, 0.78 of dwel 19.62	follo follo follo follo generalization in the selling in the s	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Table 0.57 0.38 T2 (follow steps) 19.8 19.83	A 0.9 20 Table 3 19 0.6 9a) 3 19 T1 + (1	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 5 to 7 in Table 83 19.73 - fLA) × T2	0.96 20.46 19.82 0.94 le 9c) 19.22 fLA = Liv	0.99 19.96 19.82 0.99 18.51 ring area ÷ (-	1 19.57 19.82 1 17.93 4) =		(86) (87) (88) (89) (90) (91)
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Temperature de Utilisation factor Jan (86)m= 1	uring heating for gains Feb No.99 0.99 0.99 emperature 19.8 20 uring heating heating heating heating heating heating heating 19.81 19 or for gains 0.99 0.99 emperature 18.26 18 emperature 18.81 19 ent to the meaning heating heatin	for li for re fo	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22 r the wh 19.67 internal	m the live ea, h1,n May 0.83 ea T1 (for 20.78 ea T1) for 19.82 exelling, 0.78 ea T1 (for 20.78 ea T1) for 19.62 ea T1 (for 20.03 ea T1) for 19.62 ea T1 (for 20.03 ea T1) for 19.62 ea T1 (for 20.03 ea T1) for 19.62 ea T1	ing n (s follo 2 f dw h2, c lling ratu	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Table 9a 0.57 0.38 T2 (follow steps 3 to 19.83 g) = fLA × 7 0.21 20.24 re from Table 9a June	A O.9 Table 3 19 Dole 9a) 3 0.9 Steps 3 19 T1 + (1 4 20) Dole 4e,	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 4 to 7 in Table 83 19.73 - fLA) × T2 24 20.13 where approx	0.96 20.46 19.82 0.94 e 9c) 19.22 fLA = Liv	0.99 19.96 19.82 0.99 18.51 ring area ÷ (1 19.57 19.82 1 17.93 4) =		(86) (87) (88) (89) (90) (91) (92)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal trong (87)m= 19.61 Temperature de (88)m= 19.81 Utilisation factor (89)m= 0.99 Mean internal trong (90)m= 17.98 Mean internal trong (92)m= 18.56 Apply adjustme (93)m= 18.56	uring heati or for gains Feb N 0.99 0.99 emperatur 19.8 20 uring heati 19.81 19 or for gains 0.99 0.99 emperatur 18.26 18 emperatur 18.81 19 ent to the m 18.81 19	for li for re fo	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22 r the wh	n the livea, h1,n May 0.83 ea T1 (for 20.78 ea T1) may 19.82 ea T1 (for 19.82 ea T1) may 19.62 ea T1 (for 19.62 ea T1) ea T1 (ing n (s follo 2 f dw h2, c lling ratu	ee Table 9a Jun Jul 0.67 0.5 w steps 3 to 0.94 20.99 relling from 9.83 19.83 m (see Table 0.57 0.38 T2 (follow steps 19.83 19.83 19.83 T2 (follow steps 20.21 19.8 19.83	A O.9 Table 3 19 Dole 9a) 3 0.9 Steps 3 19 T1 + (1 4 20) Dole 4e,	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 4 to 7 in Table 83 19.73 - fLA) × T2 24 20.13 where approx	0.96 20.46 19.82 0.94 le 9c) 19.22 fLA = Liv	0.99 19.96 19.82 0.99 18.51 ring area ÷ (1 19.57 19.82 1 17.93 4) =		(86) (87) (88) (89) (90) (91)
Temperature de Utilisation factor Jan (86)m= 1	uring heating for gains Feb No.99 0.99 0.99 emperatured 19.8 19.81 19.81 19.81 19.81 19.81 18.26	for li for re fo	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22 r the wh 19.67 internal 19.67	n the livea, h1,n May 0.83 ea T1 (for 20.78 in rest of 19.82 in rest of 19.62 in rest of 19	ing n (s follo 2 f dw h2, cling ratu 2	See Table 9a Jun	A O.9 Table 3 19 Dole 9a) 3 0.4 Steps 3 19 T1 + (1 4 20 Dole 4e, 4 20	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 4 to 7 in Table 83 19.73 - fLA) × T2 24 20.13 where approach	0.96 20.46 19.82 0.94 e 9c) 19.22 fLA = Liv 19.67	0.99 19.96 19.82 0.99 18.51 ving area ÷ (4) 19.03	1 19.57 19.82 1 17.93 4) = 18.52	0.36	(86) (87) (88) (89) (90) (91) (92)
Temperature de Utilisation factor Jan (86)m= 1	uring heating for gains Feb No.99 0.99 0.99 emperature 19.8 20 uring heating 19.81 19 or for gains 0.99 0.99 emperature 18.26 18 emperature 18.81 19 ent to the modern 18.81 19 ent to the modern 18.81 19 ent international internations of the modern 18.81 19 ent international international international internations of the modern 18.81 19 ent international int	for li for li for li ge in li ng pe .81 for re 97 e in t .69 e (for .19 nean .19 ment al tem	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22 r the whole 19.67 internal 19.67 internal 19.67	n the livea, h1,n May 0.83 ea T1 (for 20.78 or rest of 19.82 or rest of 19.62 or rest of dwelling, 0.78 of dwelling, 0.78 of dwelling, 19.62 or rest of dwel	ing n (s follo 2 f dw h2, cling ratu 2	See Table 9a Jun	A O.9 Table 3 19 Dole 9a) 3 0.4 Steps 3 19 T1 + (1 4 20 Dole 4e, 4 20	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 4 to 7 in Table 83 19.73 - fLA) × T2 24 20.13 where approach	0.96 20.46 19.82 0.94 e 9c) 19.22 fLA = Liv 19.67	0.99 19.96 19.82 0.99 18.51 ving area ÷ (4) 19.03	1 19.57 19.82 1 17.93 4) = 18.52	0.36	(86) (87) (88) (89) (90) (91) (92)
Temperature de Utilisation factor Jan (86)m= 1 Mean internal trong (87)m= 19.61 Temperature de (88)m= 19.81 Utilisation factor (89)m= 0.99 Mean internal trong (90)m= 17.98 Mean internal trong (92)m= 18.56 Apply adjustme (93)m= 18.56 Regional troops	uring heating for gains Feb No.99 0.99 0.99 emperature 19.8 20 uring heating 19.81 19 or for gains 0.99 0.99 emperature 18.26 18 emperature 18.81 19 ent to the modern 18.81 19 ent to the modern 18.81 19 ent international internations of the modern 18.81 19 ent international international international internations of the modern 18.81 19 ent international int	for li for li for li ge in li ng pe .81 for re 97 e in t .69 e (for .19 nean .19 ment al tem	eriods in ving are Apr 0.93 iving are 20.47 eriods in 19.82 est of do 0.91 he rest 19.22 r the whole 19.67 internal 19.67 internal 19.67	n the livea, h1,n May 0.83 ea T1 (for 20.78 or rest of 19.82 or rest of 19.62 or rest of dwelling, 0.78 of dwelling, 0.78 of dwelling, 19.62 or rest of dwel	ing n (s follo 2 f dw h2, cling ratu 2	See Table 9a Jun	A O.9 Table 3 19 Dole 9a) 3 0.4 Steps 3 19 T1 + (1 4 20 Dole 4e, 4 20	ug Sep 56 0.8 Table 9c) 98 20.86 9, Th2 (°C) 84 19.83 43 0.72 4 to 7 in Table 83 19.73 - fLA) × T2 24 20.13 where approach	0.96 20.46 19.82 0.94 e 9c) 19.22 fLA = Liv 19.67	0.99 19.96 19.82 0.99 18.51 ving area ÷ (4) 19.03	1 19.57 19.82 1 17.93 4) = 18.52	0.36	(86) (87) (88) (89) (90) (91) (92)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilis	ation fac	tor for a	ains, hm	ı .										
(94)m=	0.99	0.98	0.96	0.91	0.79	0.6	0.42	0.48	0.74	0.93	0.98	0.99		(94)
	∟—— ıl gains.	hmGm	, W = (94		L 4)m					<u> </u>		<u> </u>		
(95)m=	545.5	641.92	720.9	766.4	717.47	537.88	363.11	379.2	539.61	590.44	540.65	514.78		(95)
Montl	nly aver	age exte	rnal tem	perature	from Ta	able 8				Į.				
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm , W =	=[(39)m :	x [(93)m	– (96)m]				
(97)m=	1479.2	1439.57			848.92	565.84	367.64	386.76	611.21	923.89	1220.65	1471.87		(97)
Space			ement fo			Wh/mont	h = 0.02	24 x [(97))m – (95		1)m			
(98)m=	694.67	536.02	438.77	240.07	97.8	0	0	0	0	248.08	489.6	712.08		_
								Tota	l per year	(kWh/year) = Sum(9	8) _{15,912} =	3457.09	(98)
Space	e heatin	g require	ement in	kWh/m²	² /year								44.83	(99)
9a. En	ergy rec	quiremer	nts – Ind	ividual h	eating sy	ystems i	ncluding	micro-C	CHP)					
•	e heatir	_										ı		_
Fracti	ion of sp	ace hea	at from s	econdar	y/supple	mentary	system						0	(201)
Fracti	ion of sp	ace hea	at from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
Fracti	ion of to	tal heati	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficie	ency of r	main spa	ace heat	ing syste	em 1								93.5	(206)
Efficie	ency of s	seconda	ry/suppl	ementar	y heating	g system	າ, %						0	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Space	e heatin	g require	ement (c	alculate	d above)									
	694.67	536.02	438.77	240.07	97.8	0	0	0	0	248.08	489.6	712.08		
(211)m	n = {[(98)m x (20	(4)] } x 1	00 ÷ (20	06)									(211)
	742.97	573.28	469.27	256.76	104.6	0	0	0	0	265.33	523.64	761.58		_
								Tota	l (kWh/yea	ar) =Sum(2	211) _{15,1012}	F	3697.43	(211)
Space	e heatin	g fuel (s	econdar	y), kWh/	month									
			00 ÷ (20									ı 1		
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		٦
								rota	ı (KVVN/yea	ar) =Sum(2	215) _{15,1012}	=	0	(215)
	heating			اء اد دادان	h \									
Output	195.59	172.4	ter (calc 181.06	162.33	159.08	142.16	136.54	149.81	149.54	168.32	177.97	190.89		
Efficie		ater hea	ıter	ļ				ļ	<u> </u>	<u> </u>		<u> </u>	79.8	(216)
(217)m=		87.64	87.09	85.86	83.56	79.8	79.8	79.8	79.8	85.85	87.38	88.01		(217)
Fuel fo	r water	ı heating.	kWh/mo	onth						l		<u> </u>		
) ÷ (217)											
(219)m=	222.49	196.71	207.91	189.07	190.38	178.15	171.11	187.73	187.4	196.07	203.68	216.9		_
								Tota	I = Sum(2				2347.59	(219)
	l totals		nd main	ovotom	1					k'	Wh/year		kWh/year	7
•	_		ed, main	system	I							[3697.43	_
	•	fuel use											2347.59	
Electri	city for p	oumps, f	ans and	electric	keep-ho	t								

central heating pump: boiler with a fan-assisted flue Total electricity for the above, kWh/year	sum of (230a	30 45 a)(230g) =	(230c) (230e) 75 (231)							
Electricity for lighting	(004) (000) (0071)		336.08 (232)							
Total delivered energy for all uses (211)(221) + (231) + (232)(237b) = 6456.09 (33) 12a. CO2 emissions – Individual heating systems including micro-CHP										
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 =	798.64 (261)							
Space heating (secondary)	(215) x	0.519 =	0 (263)							
Water heating	(219) x	0.216	507.08 (264)							
Space and water heating	(261) + (262) + (263) + (264) =		1305.72 (265)							
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93 (267)							
Electricity for lighting	(232) x	0.519 =	174.42 (268)							
Total CO2, kg/year	sum	of (265)(271) =	1519.07 (272)							
TER =			29.01 (273)							