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 14:55:52*

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: D1-06

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) 27.64 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

11.87 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 55.9 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 50.2 kWh/m²

OK
2 Fabric U-values

Element Average Highest

External wall 0.15 (max. 0.30) 0.20 (max. 0.70) OK
Party wall 0.00 (max. 0.20) - OK

Floor (no floor)

 Roof
 0.10 (max. 0.20)
 0.10 (max. 0.35)
 OK

 Openings
 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/m²K	
Party Walls U-value	0 W/m²K	
Community heating, heat from electric heat pump		

Predicted Energy Assessment

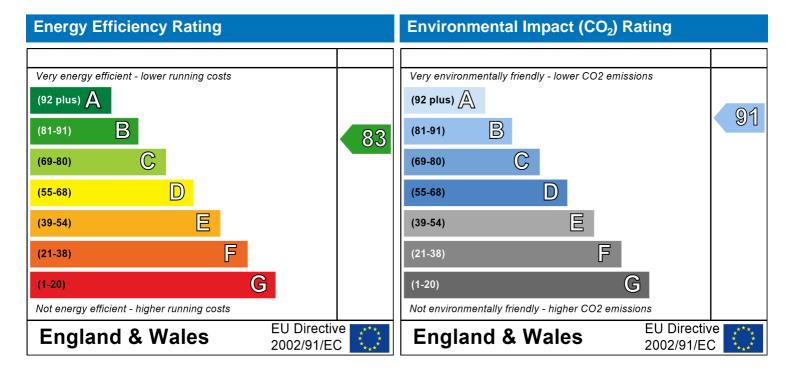


Dwelling type:
Date of assessment:
Produced by:
Total floor area:

Mid floor Flat 13 October 2022 Ben Talbutt 77.11 m²

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

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



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

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

SAP Input

Property Details: D1-06

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: 77.11 m^2 2.82 m

Living area: 27.54 m² (fraction 0.357)

Front of dwelling faces: Unspecified

Opening types:

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 F	actor: g-value:	U-value:	Area:	No. of 0
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

Openings:

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 55.53 22.15 33.38 0.14 0 False N/A Common Area Wall 21.38 0 21.38 0.2 0.9 False N/A Concrete Column 0 2.82 0.2 False 2.82 0 N/A Roof 77.11 0 77.11 0.1 0 N/A **Internal Elements** Party Elements 25.17 N/A Party Wall User-defined (individual PSI-values) Y-Value = 0.0845 Thermal bridges: Psi-value Length Other lintels (including other steel lintels) [Approved] 10.71 0.3 E2 [Approved] 7.39 0.04 E3 Sill E4 Jamb [Approved] 43.54 0.05 E7 Party floor between dwellings (in blocks of flats) 19.48 0.07 [Approved] Corner (normal) [Approved] 11.28 0.09 E16 26.41 0.08 E14 Flat roof 2.82 -0.09 E17 Corner (inverted internal area greater than external area) [Approved] Staggered party wall between dwellings 2.82 E25 0.12 Ground floor (normal) [Approved] 0 0.16 E5 Intermediate floor within a dwelling [Approved] 0 0.07 E6 0 0.32 E20 Exposed floor (normal) [Approved] Party wall between dwellings 0 0.06 E18 Eaves (insulation at ceiling level - inverted) 7.13 0.12 E24 Intermediate floor between dwellings (in blocks of flats) 8.93 0 Р3 P4 Roof (insulation at ceiling level) 8.93 0.24 Exposed floor (inverted) 0 0.24 P8 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

Stroma FSAP 2012 Version: 1.0.5.17 (SAP 9.92) - http://www.stroma.com

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 Iser I	Details:						
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012	- 036 1 L	Strom Softwa					036639 on: 1.0.5.17	
	F	Property	Address	D1-06					
Address :									
Overall dwelling dime	ensions:	Δ	a/m²)		Asz IIa	: or lo 4 / ros \		Valuma/mi	21
Ground floor			a(m²) 77.11	(1a) x		ight(m) :.82	(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) + (3c)+(3c	d)+(3e)+	(3n) -		7.6
Dwelling volume				(34)1(35	71(30)1(30	a)	.(011) =	217.45	(5)
2. Ventilation rate:	main seconda	ry	other		total			m³ per hou	ır
Number of chimneys	heating heating bearing heating	, □ + ∟	0	7 = [0	x 4	10 =	0	(6a)
Number of open flues	0 + 0	_	0]	0	x 2	20 =		(6b)
Number of intermittent fa				┙┢			10 =	0	╡`´
				Ļ	0		10 =	0	(7a)
Number of passive vents				Ļ	0			0	(7b)
Number of flueless gas f	ires			L	0	X 2	40 =	0	(7c)
							Air ch	anges per ho	our
Infiltration due to chimne	ys, flues and fans = (6a)+(6b)+(7a)+(7b)+((7c) =	Г	0		÷ (5) =	0	(8)
If a pressurisation test has b	peen carried out or is intended, procee	ed to (17),	otherwise o	continue fr	om (9) to				
Number of storeys in t	he dwelling (ns)					7(0)		0	(9)
Additional infiltration	.25 for steel or timber frame o	r 0 35 fo	r macani	v constr	ruction	[(9)-	-1]x0.1 =	0	(10)
	resent, use the value corresponding t			•	uction			0	(11)
deducting areas of openi	5 /·	4 (1	- IV - I				1		-
If suspended wooden to the sus	floor, enter 0.2 (unsealed) or 0	.1 (seale	ea), eise	enter U				0	(12)
•	s and doors draught stripped							0	(13)
Window infiltration	o and doors araugin empped		0.25 - [0.2	x (14) ÷ 1	00] =			0	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13)	+ (15) =		0	(16)
Air permeability value,	q50, expressed in cubic metro	es per ho	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 -	[0.0 75 x (1	19)] =			0.85	(19) (20)
Infiltration rate incorpora	ting shelter factor		(21) = (18) 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 infiltra	ation rate	(allowi	ng for sh	nelter an	nd 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 effect		_	rate for t	ne appıı	cable ca	ise						0.5	(23
If exhaust air he			endix N, (2	3b) = (23a	a) × Fmv (equation (I	N5)) , othe	rwise (23b) = (23a)			0.5	(23
If balanced with	heat recove	ery: effic	iency in %	allowing t	for in-use f	actor (fron	n Table 4h) =				74.8	(23
a) If balance	d mechar	nical ve	entilation	with he	at recov	ery (MV	HR) (24a	a)m = (2:	2b)m + (23b) × [1 – (23c)		'`
(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]	(24
b) If balance	d mechar	nical ve	entilation	without	heat red	covery (ľ	MV) (24b)m = (22	2b)m + (2	23b)	•	•	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h	ouse extra n < 0.5 × (•	•				.5 × (23b	o)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
d) If natural if (22b)n	ventilation n = 1, ther								0.5]			•	
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change ra	ate - er	nter (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 losses	s and hea	t loss r	paramete	er:									
ELEMENT	Gross area (r	·	Openin m	gs	Net Ar A ,r		U-val W/m2		A X U (W/I	<)	k-value kJ/m²-l		A X k kJ/K
Doors					2.52	х	0.91	=	2.2932				(26
Windows Type	1				2.9	<u>x</u> 1	/[1/(1.4)+	0.04] =	3.84				(27
Windows Type	2				5.45	<u>x</u> 1	/[1/(1.4)+	0.04] =	7.23				(27
Windows Type	3				1.99	<u></u>	/[1/(1.4)+	0.04] =	2.64				(27
Windows Type	e 4				0.9	<u>x</u> 1	/[1/(1.4)+	0.04] =	1.19				(27
Windows Type	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	Ħ			(27
Windows Type	e 7				0.9	x1	/[1/(1.4)+	0.04] =	1.19	Ħ			(27
Windows Type	8 8				1.99	x1	/[1/(1.4)+	0.04] =	2.64	=			(27
Walls Type1	55.53		22.1	5	33.38	3 x	0.14	i	4.67	= [$\neg \vdash$	(29
Walls Type2	21.38		0		21.38	3 x	0.17	=	3.62	=		i i	(29
Walls Type3	2.82		0		2.82	x	0.2	=	0.56	=		i i	(29
Roof	77.11		0		77.1	1 X	0.1	_ =	7.71	i آ		-	(30
Total area of e	lements, r	m²			156.8	4							(31
Party wall					25.17	=	0		0			7	(32
* for windows and ** include the area					alue calcu					is given in	paragraph		
Fabric heat los				•			(26)(30) + (32) =				44.89	(33
Heat capacity	Cm = S(A	xk)						((28).	(30) + (32	2) + (32a).	(32e) =	0	(34
Thermal mass	paramete	er (TMF	c = Cm ÷	- TFA) ir	n kJ/m²K			Indica	tive Value	Medium		250	(35
For design assess	sments when	e the de	tails of the	construct	ion are no	t known pi	ecisely the	e indicative	e values of	TMP in Ta	able 1f		

nerma		,	, , , ou.	culated t	uoning / ip								13.26	
details d	of therma	l bridging	are not kn	own (36) =	= 0.05 x (3	1)						!		
otal fa	bric hea	at loss							(33) +	(36) =			58.15	(3
entilat	ion hea	t loss ca	alculated	monthly	У				(38)m	= 0.33 × (25)m x (5)			
L	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
3)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 tra	ansfer c	oefficier	nt, W/K						(39)m	= (37) + (3	38)m			
9)m=	78.86	78.63	78.4	77.26	77.03	75.88	75.88	75.65	76.34	77.03	77.48	77.94		
eat los	ss para	meter (F	ILP), W/	m²K						Average = = (39)m ÷		12 /12=	77.2	(
0)m=	1.02	1.02	1.02	1	1	0.98	0.98	0.98	0.99	1	1	1.01		
ımhei	r of day	s in mor	nth (Tab	le 1a)					,	Average =	Sum(40) ₁ .	12 /12=	1	(
	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		(
. Wat	er heat	ing ener	gy requi	rement:								kWh/ye	ear:	
		pancy, I		F4		10 /T	- 100	\0\1 - 0 (2040 /-	FF		41		,
if TF/	A > 13.9 A £ 13.9), N = 1), N = 1	+ 1.76 x)2)] + 0.(ΓFA -13.	9)			
if TFA if TFA nnual educe ti	A > 13.9 A £ 13.9 averag he annua), N = 1), N = 1 e hot wa l average	+ 1.76 x ater usag hot water	ge in litre usage by	es per da 5% if the a	ay Vd,av Iwelling is	erage = designed)2)] + 0.0 (25 x N) to achieve	+ 36		9)	.34		
if TFA if TFA nnual duce ti	A > 13.9 A £ 13.9 averagine annua that 125	o, N = 1 o, N = 1 e hot wa l average litres per p	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w	es per da 5% if the d vater use, I	ay Vd,av Iwelling is thot and co	erage = designed i ld)	(25 x N) to achieve	+ 36 a water us	se target o	9) 91	.34		
if TFA if TFA nnual duce to t more	A > 13.9 A £ 13.9 averagine annua that 125	P, N = 1 P, N = 1 P hot was P average Unitres per p Feb	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w Apr	es per da 5% if the a	ay Vd,av Iwelling is hot and co	erage = designed i ld) Jul	(25 x N) to achieve	+ 36		9)			
if TFA if TFA innual duce ti t more t water	A > 13.9 A £ 13.9 averagine annua that 125	P, N = 1 P, N = 1 P hot was P average Unitres per p Feb	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w Apr	es per da 5% if the d vater use, I	ay Vd,av Iwelling is hot and co	erage = designed i ld) Jul	(25 x N) to achieve	+ 36 a water us	se target o	9) 91	.34		
if TFA if TFA inual duce ti t more t water	A > 13.9 A £ 13.9 averagence annual that 125 Jan r usage ir	P, N = 1 P, N = 1 Pe hot was Playerage Plitres per p Peb Politres per	+ 1.76 x ater usag hot water person per Mar day for ea	ge in litre usage by a day (all w Apr ach month	es per da 5% if the o vater use, I May Vd,m = fa	ay Vd,av Iwelling is that and co Jun ctor from	erage = designed in designed i	(25 x N) to achieve Aug (43)	+ 36 a water us Sep	ose target o	9) 91 Nov 96.82	.34 Dec 100.47	1096.04	
if TFA if TFA nual educe ti t more t water	A > 13.9 A £ 13.9 averag he annua that 125 Jan r usage ir	P, N = 1 P, N = 1 Pe hot was laverage litres per	+ 1.76 x ater usag hot water person per Mar day for ea	ge in litre usage by s day (all w Apr ach month 89.51	es per da 5% if the d vater use, I May Vd,m = fa 85.86	ay Vd,av lwelling is not and co Jun ctor from 1	erage = designed in did	(25 x N) to achieve Aug (43)	+ 36 a water us Sep 89.51	Oct 93.16 Total = Sui	9) 91 Nov 96.82 m(44)12 =	.34 Dec 100.47	1096.04	(
if TFA if TFA nual duce ti t more t water ergy co	A > 13.9 A £ 13.9 averag he annua that 125 Jan r usage ir	P, N = 1 P, N = 1 Pe hot was laverage litres per	+ 1.76 x ater usag hot water person per Mar day for ea	ge in litre usage by s day (all w Apr ach month 89.51	es per da 5% if the d vater use, I May Vd,m = fa 85.86	ay Vd,av lwelling is not and co Jun ctor from 1	erage = designed in did	(25 x N) to achieve Aug (43) 85.86	+ 36 a water us Sep 89.51	Oct 93.16 Total = Sui	9) 91 Nov 96.82 m(44)12 =	.34 Dec 100.47	1096.04	(
if TFA if TFA innual duce ti t more t water ergy co	A > 13.9 A £ 13.9 averaghe annual that 125 Jan rusage ir 100.47	P, N = 1 P, N = 1 Pe hot was laverage litres per	+ 1.76 x ater usag hot water person per Mar day for ea 93.16 used - cale 134.47	ge in litre usage by a day (all w Apr ach month 89.51 culated mo	es per da 5% if the orater use, I May $Vd,m = fa$ 85.86 $enthly = 4$.	ay Vd,av lwelling is not and co Jun ctor from 7 82.2 190 x Vd,r 97.07	erage = designed to ld) Jul Table 1c x 82.2 m x nm x E 89.95	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22	+ 36 a water us Sep 89.51 0 kWh/more 104.45	Oct 93.16 Fotal = Suith (see Ta	9) 91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87	.34 Dec 100.47 c, 1d) 144.29	1096.04	
if TFA if TFA innual educe ti t more t water ergy co ergy co so)m= nstanta	A > 13.9 A £ 13.9 average the annual that 125 Jan r usage in 100.47 ontent of 148.99	P, N = 1 P, N = 1 P hot was laverage litres per p Peb litres per 96.82 Phot water 130.31	ter usaghot water person per Mar day for ea 93.16 used - calc 134.47	Apr Apr ach month 89.51 culated mo 117.23	es per da 5% if the of rater use, I May Vd,m = far 85.86 onthly = 4.	ay Vd,av lwelling is not and co Jun ctor from 7 82.2 190 x Vd,r 97.07	erage = designed of ld) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22 boxes (46)	+ 36 a water us Sep 89.51 0 kWh/mon 104.45	Oct 93.16 Fotal = Sur 121.73 Fotal = Sur	9) 91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	.34 Dec 100.47		
if TFA if TFA innual duce ti t more t water ergy co ergy co instanta	A > 13.9 A £ 13.9 average he annual that 125 Jan rusage in 100.47 ontent of 148.99 aneous with 123.9	P, N = 1 P, N = 1 P hot was I average litres per p Peb Politres per 96.82 hot water 130.31 ater heatin	+ 1.76 x ater usag hot water person per Mar day for ea 93.16 used - cale 134.47	ge in litre usage by a day (all w Apr ach month 89.51 culated mo	es per da 5% if the orater use, I May $Vd,m = fa$ 85.86 $enthly = 4$.	ay Vd,av lwelling is not and co Jun ctor from 7 82.2 190 x Vd,r 97.07	erage = designed to ld) Jul Table 1c x 82.2 m x nm x E 89.95	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22	+ 36 a water us Sep 89.51 0 kWh/more 104.45	Oct 93.16 Fotal = Sunth (see Tail 121.73	9) 91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87	.34 Dec 100.47 c, 1d) 144.29		
if TFA if TFA in	A > 13.9 A £ 13.9 average the annual that 125 Jan rusage in 100.47 ontent of 148.99 aneous we 22.35 storage	P, N = 1 P, N = 1 P hot was a verage litres per	+ 1.76 x ater usaghot water person per Mar day for ear 93.16 used - calc 134.47 ag at point 20.17	ge in litre usage by a day (all w Apr ach month 89.51 culated mo 117.23 of use (no	es per da 5% if the da 5% if th	ay Vd,av lwelling is not and co Jun ctor from 1 82.2 190 x Vd,r 97.07	erage = designed in did) 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 07m / 3600 103.22 boxes (46)	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 1 to (61) 15.67	Oct 93.16 Total = Sunth (see Tail 121.73 Total = Sunth (18.26	9) 91 Nov 96.82 m(44) 112 = ables 1b, 1 132.87 m(45) 112 = 1 19.93	.34 Dec 100.47		
if TFA if TFA inual duce ti t more t water ergy co instanta s)m= ater s orage	A > 13.9 A £ 13.9 average he annual that 125 Jan rusage in 100.47 ontent of 148.99 aneous we 22.35 storage evolume	Popular No. 10, N = 1	ter usaghot water berson per Mar day for ea 93.16 used - calcate 134.47 ag at point 20.17	Apr	es per da 5% if the da 5% if th	ay Vd,av welling is not and co Jun ctor from 1 82.2 190 x Vd,r 97.07 storage),	erage = designed to 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) 85.86 103.22 boxes (46) 15.48 within sa	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 1 to (61) 15.67	Oct 93.16 Total = Sunth (see Tail 121.73 Total = Sunth (18.26	9) 91 Nov 96.82 m(44) 112 = ables 1b, 1 132.87 m(45) 112 = 1 19.93	.34 Dec 100.47 = c, 1d) 144.29 =		
if TFA if TFA in	A > 13.9 A £ 13.9 average the annual that 125 Jan rusage in 100.47 ontent of 148.99 aneous we 22.35 storage wolume of the annual that 125	Popular No. 10, N = 1 Popular No. 10, N = 1 Popular No. 11 Popular No. 12 Popular	ter usaghot water berson per Mar day for ea 93.16 134.47 including and no ta	ge in litre usage by a day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ng any so nk in dw	es per da 5% if the of rater use, I May Vd,m = fat 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W velling, e	ay Vd,av Iwelling is not and co Jun ctor from 1 82.2 190 x Vd,r 97.07 storage), 14.56	erage = designed in did) Jul Table 1c x 82.2 m x nm x E 89.95 enter 0 in 13.49 storage litres in	(25 x N) to achieve Aug (43) 85.86 103.22 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 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	.34 Dec 100.47 = c, 1d) 144.29 =		
if TFA if TFA inual duce ti t more t water ergy co instanta si)m= ater s orage comm herwi ater s	A > 13.9 A £ 13.9 average he annual that 125 Jan rusage in 100.47 100.47 ontent of 148.99 aneous we 22.35 storage evolument of the ise if no storage	Popular No. 10, N = 1	ter usaghot water berson per Mar day for ea 93.16 used - calcate 134.47 ag at point 20.17 including the talcate that water that w	ge in litre usage by a day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so nk in dw er (this in	es per da 5% if the of water use, I May Vd,m = fact 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W welling, e	ay Vd,av welling is not and co Jun ctor from 1 82.2 190 x Vd,r 97.07 storage), 14.56 /WHRS nter 110 nstantar	erage = designed in designed i	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22 boxes (46) 15.48 within sa (47)	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 0 to (61) 15.67 ame vess	Oct 93.16 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ =	.34 Dec 100.47 = c, 1d) 144.29 =		
if TFA if TFA if TFA in ual educe ti t more it water in stanta is in = [ater s orage commit ater s it herwi ater s it If ma	A > 13.9 A £ 13.9 average he annual that 125 Jan 100.47 100.47 ontent of 148.99 aneous we 22.35 storage evolument of the ise if no istorage anufaction.	Popular No. 10, N = 1 on N = 1	ter usaghot water berson per Mar day for ea 93.16 134.47 ag at point 20.17 including the modern of the water beclared lead to the water because the water	Apr Apr Apr Apr Assumed to the second to the	es per da 5% if the of rater use, I May Vd,m = fat 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W velling, e	ay Vd,av welling is not and co Jun ctor from 1 82.2 190 x Vd,r 97.07 storage), 14.56 /WHRS nter 110 nstantar	erage = designed in designed i	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22 boxes (46) 15.48 within sa (47)	+ 36 a water us Sep 89.51 0 kWh/mor 104.45 0 to (61) 15.67 ame vess	Oct 93.16 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	.34 Dec 100.47 = c, 1d) 144.29 =		
if TFA if TFA if TFA in ual educe to t more t water are rgy co solon= commetater solonage commetater solonage in the rwiter solonage in	A > 13.9 A £ 13.9 average he annual that 125 Jan Tusage ir 100.47 ontent of 148.99 aneous was a volume annuity he ise if no storage anufaction at the anu	Poly N = 1	ter usaghot water berson per Mar day for ear 93.16 134.47 139 at point 20.17 including and no talk that water eclared lem Table	ge in litre usage by a day (all w Apr ach month 89.51 117.23 of use (not 17.59 ag any so nk in dw er (this in oss facto 2b	es per da 5% if the of rater use, I May Vd,m = fat 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W relling, encludes i	ay Vd,av welling is not and co Jun ctor from 1 82.2 190 x Vd,r 97.07 storage), 14.56 /WHRS nter 110 nstantar	erage = designed in designed i	(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 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) 91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	.34 Dec 100.47 c, 1d) 144.29 21.64		
if TFA if TFA in	A > 13.9 A £ 13.9 average he annual that 125 Jan 100.47 100.47 148.99 22.35 storage evolument of the annufactorage annufactorag	Poly N = 1	ter usaghot water berson per Mar day for ea 93.16 134.47 134.47 includin nd no ta hot water ceclared le storage eclared celared cel	ge in litre usage by a day (all w Apr ach month 89.51 culated mo 117.23 of use (no 17.59 ag any so nk in dw er (this in oss facto 2b , kWh/ye cylinder l	es per da 5% if the of water use, I May Vd,m = far 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W welling, e ncludes i or is kno	ay Vd,av welling is not and co	erage = designed in designed i	(25 x N) to achieve Aug (43) 85.86 07m / 3600 103.22 boxes (46) 15.48 within sa (47)	+ 36 a water us Sep 89.51 0 kWh/more 104.45 15.67 ame vess ers) ente	Oct 93.16 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) Nov 96.82 m(44) 112 = ables 1b, 1 132.87 m(45) 112 = 19.93	.34 Dec 100.47 c, 1d) 144.29 21.64 0		
if TFA if TFA if TFA in ual educe ti t more t water if water if water if ym= if water if water if ym= if ymater if ym	A > 13.9 A £ 13.9 average he annual that 125 Jan rusage ir 100.47 100.47 148.99 22.35 storage e volument of the anufaction of the anuf	Poly N = 1	ter usage hot water overson per Mar day for ear 93.16 134.47 including at point 20.17 including at water overson per day for ear day fo	ge in litre usage by a day (all w Apr ach month 89.51 culated mo 17.59 ag any so nk in dw er (this in oss facto 2b , kWh/ye cylinder I om Tabl	es per da 5% if the of water use, I May Vd,m = far 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W welling, e ocludes i or is knowear	ay Vd,av welling is not and co	erage = designed in designed i	(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 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	.34 Dec 100.47 = c, 1d) 144.29 = 21.64 0		
if TFA if TFA if TFA in ual educe ti t more of water are ray co instanta fater s orage comm therwi ater s orage in the rwi ater s orage in the rwi ater s orage in the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage the rwi ater s orage comm the rwi ater s orage co	A > 13.9 A £ 13.9 average he annual that 125 Jan 100.47 100.47 100.47 148.99 22.35 storage evoluments if no storage anufactorage anufactoration for anufactoration for anufactoration for anufactoration for anufactoration anufactoration anufactoration for anufactoration anufac	Poly N = 1	ter usage hot water person per Mar day for ear 93.16 134.47 134.47 134.47 including at point and no tale hot water eclared lear to storage eclared of factor free sections.	ge in litre usage by a day (all w Apr ach month 89.51 culated mo 17.59 ag any so nk in dw er (this in oss facto 2b , kWh/ye cylinder I om Tabl	es per da 5% if the of water use, I May Vd,m = far 85.86 onthly = 4. 112.49 o hot water 16.87 olar or W welling, e ncludes i or is kno	ay Vd,av welling is not and co	erage = designed in designed i	(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 Total = Sunth (see Tail 121.73 Total = Sunth (see Sun	9) 91 Nov 96.82 m(44) ₁₁₂ = ables 1b, 1 132.87 m(45) ₁₁₂ = 19.93	.34 Dec 100.47 c, 1d) 144.29 21.64 0		

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 Nov .34 144.34	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= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 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 -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	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= 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 144.34 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 -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	x	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	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	x	7	2.63	x	0.4	X	0.8	=	14.5	(81)
Northwest _{0.9x}	0.77	X	0.6	62	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	<u> </u>	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	x	0.	9	x	2	8.07	x	0.4	x	0.8		5.6	(81)
Northwest 0.9x	0.77	X	0.6	62	x	2	8.07	x	0.4	X	0.8	=	3.86	(81)
Northwest 0.9x	0.77	x	1.9	99	x	1	14.2	x	0.4	x	0.8		12.53	(81)
Northwest 0.9x	0.77	x	0.	9	x		14.2	x	0.4	X	0.8	=	2.83	(81)
Northwest 0.9x	0.77	x	0.6	62	x	1	14.2	x	0.4	x	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	62	x	9	9.21	x	0.4	x	0.8	=	1.27	(81)
Solar gains in	watts, cal	lculated	for eac	h mont	h			(83)m	n = Sum(74)m	(82)m				
(83)m= 117.8	206.87	299.59	398.92	472.12	2 4	79.83	457.98	401	.67 333.72	233.1	142.23	100.08]	(83)
Total gains – i	nternal ar	nd solar	(84)m =	= (73)m	1 + (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)
7. Mean inter	nal tampa	1 /	(I										_	
1. Mean inter	nai tembe	erature (heatind	seaso	n)									
	•	`				area f	from Tal	ole 9	, Th1 (°C)				21	(85)
Temperature	during he	eating pe	eriods ir	n the liv	/ing			ole 9	, Th1 (°C)				21	(85)
Temperature Utilisation fac	during he	eating pe	eriods ir	n the live ea, h1,r	/ing m (s	ee Ta				Oct	Nov	Dec	21	(85)
Temperature	during he	eating pe	eriods ir	n the liv	/ing m (s		ble 9a)		ug Sep	Oct	. Nov	Dec 0.99	21	(85)
Temperature Utilisation fac Jan (86)m= 0.98	during he tor for ga Feb	eating periods ins for li	eriods ir ving are Apr 0.85	n the livea, h1,r May	ving m (s	ee Ta Jun ^{0.5}	ble 9a) Jul 0.36	A 0.	ug Sep 4 0.63		+		21	
Temperature Utilisation fac Jan (86)m= 0.98 Mean interna	during he tor for ga Feb 0.97	eating periods for lims for li	eriods ir ving are Apr 0.85 iving are	n the livea, h1,r May 0.7	ving m (s	ee Ta Jun ^{0.5} ow ste	ble 9a) Jul 0.36 ps 3 to 7	A o.	ug Sep 4 0.63	0.88	0.97	0.99	21	(86)
Temperature Utilisation fac Jan (86)m= 0.98 Mean interna (87)m= 20.23	during heater for gate Feb 0.97 tempera 20.38	eating periods for line Mar 0.94 atture in line 20.59	eriods ir ving are Apr 0.85 iving are	n the livea, h1,r May 0.7 ea T1 (20.95	ring m (s r	ee Ta Jun 0.5 ow ste	Jul 0.36 ps 3 to 7	0.7 in T	ug Sep 4 0.63 Table 9c) 1 20.98		0.97		21	
Temperature Utilisation factors Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature	during he tor for ga Feb 0.97 I tempera 20.38 during he	eating periods for line Mar 0.94 ature in line 20.59 eating periods	eriods in Apr 0.85 iving are 20.82 eriods in	n the lives a, h1,r May 0.7 ea T1 (20.95	ring m (s r follo	ee Ta Jun 0.5 ow ste 20.99 /elling	Jul 0.36 ps 3 to 7 21 from Ta	A 0.7 in T 2 able 9	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C)	0.88	0.97	0.99	21	(86)
Temperature Utilisation fac Jan (86)m= 0.98 Mean interna (87)m= 20.23	during heater for gate Feb 0.97 tempera 20.38	eating periods for line Mar 0.94 atture in line 20.59	eriods ir ving are Apr 0.85 iving are	n the livea, h1,r May 0.7 ea T1 (20.95	ring m (s r follo	ee Ta Jun 0.5 ow ste	Jul 0.36 ps 3 to 7	0.7 in T	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C)	0.88	0.97	0.99	21	(86)
Temperature Utilisation factors Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature	during he tor for ga Feb 0.97 I tempera 20.38 during he 20.07	eating periods for line Mar 0.94 exture in line 20.59 eating periods 20.07	Apr 0.85 iving are 20.82 eriods ir	n the lives, h1,r May 0.7 ea T1 (20.95 n rest o 20.08	ring m (s r follo	ee Ta Jun 0.5 ow ste 20.99 velling 20.1	Jul 0.36 ps 3 to 7 21 from Ta 20.1	A 0.7 in T 2 able 9	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C)	0.88	0.97	0.99	21	(86)
Temperature Utilisation factors Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature (88)m= 20.06	during he tor for ga Feb 0.97 I tempera 20.38 during he 20.07	eating periods for line Mar 0.94 exture in line 20.59 eating periods 20.07	Apr 0.85 iving are 20.82 eriods ir	n the lives, h1,r May 0.7 ea T1 (20.95 n rest o 20.08	ving m (s	ee Ta Jun 0.5 ow ste 20.99 velling 20.1	Jul 0.36 ps 3 to 7 21 from Ta 20.1	A 0.7 in T 2 able 9	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) .1 20.09	0.88	2 20.49	0.99	21	(86)
Temperature Utilisation factors Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature (88)m= 20.06 Utilisation factors	tor for ga Feb 0.97 I tempera 20.38 during he 20.07 ctor for ga 0.96	eating periods for line for recognitions	eriods in ving are 0.85 iving are 20.82 eriods in 20.08 est of di 0.81	ea, h1,r May 0.7 ea T1 (20.95 n rest o 20.08 welling 0.64	ving m (s	ee Ta Jun 0.5 ow ste 20.99 velling 20.1 ,m (se 0.44	Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29	A 0.7 in T 2 able 9 20 9a) 0.3	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09	20.82 20.08 20.08	2 20.49	0.99 20.2 20.07	21	(86) (87) (88)
Temperature Utilisation factors Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature (88)m= 20.06 Utilisation factors (89)m= 0.98	tor for ga Feb 0.97 I tempera 20.38 during he 20.07 ctor for ga 0.96	eating periods for line for recognitions	eriods in ving are 0.85 iving are 20.82 eriods in 20.08 est of di 0.81	ea, h1,r May 0.7 ea T1 (20.95 n rest o 20.08 welling 0.64	ving m (s / / / / / / / / / / / / / / / / / /	ee Ta Jun 0.5 ow ste 20.99 velling 20.1 ,m (se 0.44	Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29	A 0.7 in T 2 able 9 20 9a) 0.3	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09 32 0.55 to 7 in Tab	20.82 20.08 20.08	0.97 2 20.49 3 20.08 0.96	0.99 20.2 20.07		(86) (87) (88)
Temperature Utilisation factors Jan (86)m= 0.98 Mean internation (87)m= 20.23 Temperature (88)m= 20.06 Utilisation factors (89)m= 0.98 Mean internation	during he tor for ga Feb 0.97 I tempera 20.38 during he 20.07 eter for ga 0.96 I tempera	eating periods for line for real line for line for real line for real line for real line for real line for	eriods in Apr 0.85 iving are 20.82 eriods in 20.08 est of do 0.81 he rest	ea, h1,r May 0.7 ea T1 (20.95 rest o 20.08 welling 0.64 of dwe	ving m (s / / / / / / / / / / / / / / / / / /	ee Ta Jun 0.5 ow ste 20.99 /elling 20.1 ,m (se 0.44	Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29 collow ste	A 0 7 in T 2 20 9a) 0.3	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09 32 0.55 1 to 7 in Tab 1 20.08	0.88 20.82 20.08 0.84 le 9c)	0.97 2 20.49 3 20.08 0.96	0.99 20.2 20.07 0.98	21	(86) (87) (88) (89)
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Temperature Utilisation factors Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature (88)m= 20.06 Utilisation factors (89)m= 0.98 Mean interna (90)m= 19.06 Mean interna (92)m= 19.48	during heater for garent for for garent for	eating periods in the form of the following periods of the following periods of the following form of the foll	eriods in ving are Apr 0.85 iving are 20.82 eriods in 20.08 est of di 0.81 he rest 19.89 r the wh	the livea, h1,r May 0.7 ea T1 (20.95 rest of 20.08 welling 0.64 of dwe 20.04	ving m (s ving follows) / m (s	ee Ta Jun 0.5 ow stee 20.99 velling 20.1 ,m (see 0.44 T2 (fd 20.09) g) = fl 20.41	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29 collow ste 20.1 A × T1 20.42	A A 0 7 in T 2 able 9 20 9a) 0.3 eps 3 20 + (1 20.	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) .1 20.09 32 0.55 3 to 7 in Tab .1 20.08 - fLA) × T2 42 20.4	0.88 20.82 20.08 0.84 e 9c) 19.89 fLA = Li	0.97 2 20.49 3 20.08 0.96 0 19.45 ving area ÷ (4	0.99 20.2 20.07 0.98		(86) (87) (88) (89)
Temperature Utilisation fact Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature (88)m= 20.06 Utilisation fact (89)m= 0.98 Mean interna (90)m= 19.06 Mean interna (92)m= 19.48 Apply adjustr	during he stor for ga Feb 0.97 I tempera 20.38 during he 20.07 stor for ga 0.96 I tempera 19.28 I tempera 19.68 nent to th	eating periods for line for real line for re	eriods in ving are Apr 0.85 iving are 20.82 eriods in 20.08 est of di 0.81 he rest 19.89 r the wh	the lives, h1,r May 0.7 ea T1 (20.95 rest of 20.08 welling 0.64 of dwe 20.04 tole dw 20.37 I tempe	ring m (s	ee Ta Jun 0.5 ow stee 20.99 velling 20.1 ,m (see 0.44 T2 (fd 20.09) g) = fl 20.41	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29 collow ste 20.1 A × T1 20.42	A A 0.7 in T 2 able 9 20 9a) 0.3 20 + (1 20.4 4e,	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09 82 0.55 1 to 7 in Tab 1 20.08 - fLA) × T2 42 20.4 where appre	0.88 20.82 20.08 0.84 le 9c) 19.89 fLA = Li 20.22 copriate	0.97 2 20.49 3 20.08 0.96 19.45 ving area ÷ (4	0.99 20.2 20.07 0.98 19.03 4) =		(86) (87) (88) (89) (90)
Temperature Utilisation fact Jan (86)m= 0.98 Mean interna (87)m= 20.23 Temperature (88)m= 20.06 Utilisation fact (89)m= 0.98 Mean interna (90)m= 19.06 Mean interna (92)m= 19.48 Apply adjustr (93)m= 19.48	during heter for garen for	eating periods in the form of the following periods of the following pe	eriods in ving are Apr 0.85 iving are 20.82 eriods in 20.08 est of drong and 0.81 he rest 19.89 r the who 20.22 internal	the livea, h1,r May 0.7 ea T1 (20.95 rest of 20.08 welling 0.64 of dwe 20.04	ring m (s	ee Ta Jun 0.5 ow stel 20.99 /elling 20.1 ,m (se 0.44 T2 (fo 20.09 g) = fl 20.41 ure fro	Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29 collow ste 20.1 A × T1 20.42 m Table	A A 0 7 in T 2 able 9 20 9a) 0.3 eps 3 20 + (1 20.	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09 82 0.55 1 to 7 in Tab 1 20.08 - fLA) × T2 42 20.4 where appre	0.88 20.82 20.08 0.84 e 9c) 19.89 fLA = Li	0.97 2 20.49 3 20.08 0.96 19.45 ving area ÷ (4	0.99 20.2 20.07 0.98 19.03 4) =		(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 0.98 Mean internation (87)m= 20.23 Temperature (88)m= 20.06 Utilisation fact (89)m= 0.98 Mean internation (90)m= 19.06 Mean internation (92)m= 19.48 Apply adjustr (93)m= 19.48 8. Space hear	during he stor for ga Feb 0.97 I tempera 20.38 during he 20.07 stor for ga 0.96 I tempera 19.28 I tempera 19.68 nent to th 19.68 ting requi	eating periods for line for real line for re	eriods in ving are Apr 0.85 iving are 20.82 eriods in 20.08 est of di 0.81 he rest 19.89 r the wh 20.22 internal 20.22	ea, h1,r May 0.7 ea T1 (20.95 n rest o 20.08 welling 0.64 of dwe 20.04 lole dw 20.37 l tempe 20.37	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta Jun 0.5 ow stel 20.99 velling 20.1 ,m (se 0.44 T2 (fo 20.09 g) = fl 20.41 ure fro 20.41	Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29 collow ste 20.1 A × T1 20.42 m Table 20.42	A A 0.7 in T 2 able 9 20 9a) 0.3 20 + (1 20. 44e, 20.	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09 32 0.55 1 to 7 in Tab 1 20.08 - fLA) × T2 42 20.4 where appredate ap	0.88 20.82 20.08 0.84 le 9c) 19.89 fLA = Lii 20.22 copriate 20.22	0.97 2 20.49 3 20.08 0.96 0 19.45 ving area ÷ (4	0.99 20.2 20.07 0.98 19.03 4) = 19.45	0.36	(86) (87) (88) (89) (90) (91)
Temperature Utilisation fact Jan (86)m= 0.98 Mean internation (87)m= 20.23 Temperature (88)m= 20.06 Utilisation fact (89)m= 0.98 Mean internation (90)m= 19.06 Mean internation (92)m= 19.48 Apply adjustr (93)m= 19.48	during heater for garent for gare	eating periods in section of the sec	eriods in ving are Apr 0.85 iving are 20.82 eriods in 20.08 est of d 0.81 he rest 19.89 r the wh 20.22 internal 20.22 inperature	the lives, h1,r May 0.7 ea T1 (20.95 n rest o 20.08 welling 0.64 of dwe 20.04 cole dw 20.37 tempe 20.37 re obta	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta Jun 0.5 ow stel 20.99 velling 20.1 ,m (se 0.44 T2 (fo 20.09 g) = fl 20.41 ure fro 20.41	Jul 0.36 ps 3 to 7 21 from Ta 20.1 ee Table 0.29 collow ste 20.1 A × T1 20.42 m Table 20.42	A A 0.7 in T 2 able 9 20 9a) 0.3 20 + (1 20. 44e, 20.	ug Sep 4 0.63 Table 9c) 1 20.98 9, Th2 (°C) 1 20.09 32 0.55 1 to 7 in Tab 1 20.08 - fLA) × T2 42 20.4 where appredate ap	0.88 20.82 20.08 0.84 le 9c) 19.89 fLA = Lii 20.22 copriate 20.22	0.97 2 20.49 3 20.08 0.96 0 19.45 ving area ÷ (4	0.99 20.2 20.07 0.98 19.03 4) = 19.45	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:	0.05	0.50	0.05	0.05	0.00		(94)
(94)m= 0.98 0.96 0.92 0.82 0.66 0.46 0.32 Useful gains, hmGm , W = (94)m x (84)m	0.35	0.58	0.85	0.95	0.98		(94)
	303.63	470.77	632.01	660.69	664.18		(95)
Monthly average external temperature from Table 8	<u>l</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]				
	304.13	480.92	741.34	985.82	1188.4		(97)
Space heating requirement for each month, kWh/month = 0.024					000.00		
(98)m= 375 269.24 192.81 78.55 20.21 0 0	0	0	81.34	234.1	390.02	1011.07	(08)
	lotal	per year	(kwh/year) = Sum(9	8) _{15,912} =	1641.27	(98)
Space heating requirement in kWh/m²/year						21.28	(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) =	abio i i	, •	5110		[[(302)
		DUD1	((- (b b (1	(302)
The community scheme may obtain heat from several sources. The procedure allowing includes boilers, heat pumps, geothermal and waste heat from power stations. Se			ıp to tour (otner neat	sources; tr	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 communi							
Table 101 control and charging method (Table 40(0)) for continuing	nity heat	ting syst	tem			1	(305)
Distribution loss factor (Table 12c) for community heating system	•	ting syst	tem		[[1.05	(305)
	•	ting syst	tem		[(306)
Distribution loss factor (Table 12c) for community heating system	•	ting syst	tem]]]	1.05	(306)
Distribution loss factor (Table 12c) for community heating system Space heating	1			5) x (306) :	 -	1.05 kWh/ye	(306)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement		(98) x (30)4a) x (305	, , ,	[= [1.05 kWh/ye 1641.27	(306)
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump	n Table	(98) x (30 4a or A)4a) x (305	E)	[= [[1.05 kWh/ye 1641.27 1723.34	(306)
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)	n Table	(98) x (30 4a or A	04a) x (309 ppendix	E)	[= [1.05 kWh/ye 1641.27 1723.34 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	n Table	(98) x (30 4a or A	04a) x (309 ppendix	E)	[= [[1.05 kWh/ye 1641.27 1723.34 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	n Table m	(98) x (30 4a or A (98) x (30	04a) x (308 ppendix 01) x 100 -	E)	[]]	1.05 kWh/ye 1641.27 1723.34 0 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:	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30	04a) x (309 ppendix 01) x 100 -	E) - (308) =	[[[1.05 kWh/ye 1641.27 1723.34 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 Electricity used for heat distribution	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30	04a) x (309 ppendix 01) x 100 -	E) = (308) = (5) x (306) =	[[[1.05 kWh/ye 1641.27 1723.34 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	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30	04a) x (305 ppendix 01) x 100 ± 03a) x (305 (307e) +	E) = (308) = (5) x (306) =	[[[1.05 kWh/ye 1641.27 1723.34 0 0 2087.92 2192.31 39.16	(306) (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 Space cooling (if there is a fixed cooling system, if not enter 0)	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30 × [(307a).	04a) x (305 ppendix 01) x 100 ± 03a) x (305 (307e) +	E) = (308) = (5) x (306) =	[[[1.05 kWh/ye 1641.27 1723.34 0 0 2087.92 2192.31 39.16 0	(306) (307a) (308 (309) (310a) (313) (314)
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	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30 × [(307a).	04a) x (305 ppendix 01) x 100 ± 03a) x (305 (307e) +	E) = (308) = (5) x (306) =	[[[1.05 kWh/ye 1641.27 1723.34 0 0 2087.92 2192.31 39.16 0	(306) (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):	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30 × [(307a).	04a) x (305 ppendix 01) x 100 ± 03a) x (305 (307e) +	E) = (308) = (5) x (306) =	[[[1.05 kWh/ye 1641.27 1723.34 0 0 2087.92 2192.31 39.16 0 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 or	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30 × [(307a).	04a) x (305 ppendix 01) x 100 ± 03a) x (305 (307e) +	E) = (308) = (5) x (306) =	[[[1.05 kWh/ye 1641.27 1723.34 0 0 2087.92 2192.31 39.16 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	n Table m 0.01 :	(98) x (30) 4a or A (98) x (30) (64) x (30) x [(307a).	04a) x (305 ppendix 01) x 100 ± 03a) x (305 (307e) +	E) - (308) = - (5) x (306) = - (310a)([[[1.05 kWh/ye 1641.27 1723.34 0 0 2087.92 2192.31 39.16 0 0 202.28	(306) ear (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b)

Energy for lighting (calculated in Appe	enuix L)			335.82	(332)
Total delivered energy for all uses (30	07) + (309) + (310) + ((312) + (315) + (331)	+ (332)(237b) =	4453.75	(338)
10b. Fuel costs – Community heating	g scheme				
	Fuel kWh/y	vear	Fuel Price (Table 12)	Fuel Cost £/year	
Space heating from CHP	(307a)	x	4.24 × 0.01	73.07	(340a)
Water heating from CHP	(310a)	x	4.24 x 0.01	92.95	(342a)
Pumps and fans	(331)		Fuel Price	=	7(240)
·	(332)		10.10	20.00	(349)
Energy for lighting Additional standing charges (Table 12)			13.19 X 0.01	77.23](350)
	•			120	<u>(351)</u>
Total energy cost	= (340a)(342e) + (34	45)(354) =		357	(355)
11b. SAP rating - Community heating	g scheme				
Energy cost deflator (Table 12)				0.42	(356)
Energy cost factor (ECF)	[(355) x (356)] ÷ [(4) +	45.0] =		1.23	(357)
SAP rating (section12)				82.87	(358)
12b. CO2 Emissions – Community he	eating scheme	Energy	Emission factor	r Emissions	
		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	iuel 383	(367a
CO2 associated with heat source 1	[(3	07b)+(310b)] x 100 ÷ (367	(b) x 0.52	= 530.61	(367)
Electrical energy for heat distribution		[(313) x	0.52	= 20.32	(372)
Total CO2 associated with community	y systems	(363)(366) + (368)(372)	= 550.93	(373)
CO2 associated with space heating (s	secondary)	(309) x	0	= 0	(374)
CO2 associated with water from imme	ersion heater or instar	ntaneous heater (31	2) x 0.22	= 0	(375)
		(0.	-/ ·· U.ZZ		┙` ′
Total CO2 associated with space and	water heating	(373) + (374) + (375	, , , , , , , , , , , , , , , , , , , ,	550.93	(376)
Total CO2 associated with space and CO2 associated with electricity for pur	· ·	(373) + (374) + (375	, , , , , , , , , , , , , , , , , , , ,	550.93 = 104.98	
·	mps and fans within c	(373) + (374) + (375)) =		(376)
CO2 associated with electricity for pur	mps and fans within c	(373) + (374) + (375) dwelling (331)) x (332))) x	0.52	= 104.98	(376) (378)
CO2 associated with electricity for pur CO2 associated with electricity for light	mps and fans within c	(373) + (374) + (375) dwelling (331)) x (332))) x	0.52	= 104.98 = 174.29	(376) (378) (379)
CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year	mps and fans within ching sum of (376)(382) =	(373) + (374) + (375) dwelling (331)) x (332))) x	0.52	= 104.98 = 174.29 830.2	(376) (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 ching sum of (376)(382) = (383) ÷ (4) =	(373) + (374) + (375) dwelling (331)) x (332))) x	0.52	= 104.98 = 174.29 830.2 10.77 90.89	(376) (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 ching sum of (376)(382) = (383) ÷ (4) =	(373) + (374) + (375) dwelling (331)) x (332))) x	0.52	= 104.98 = 174.29 830.2 10.77	(376) (378) (379) (383) (384)

Energy associated with heat source 1	[(307b)+(310b)] x 100 ÷ (367b) x	3.07	=	3138.65	(367)
Electrical energy for heat distribution	[(313) x		=	120.21	(372)
Total Energy associated with community systems	(363)(366) + (368)(372))	=	3258.86	(373)
if it is negative set (373) to zero (unless specified oth	erwise, see C7 in Appendix C)	1		3258.86	(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) =			3258.86	(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) =			4910.83	(383)

		Hear F	Details:						
A Nome -	Dan Tallautt	USELL		- M			CTDO	000000	
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012		Strom Softwa					036639 on: 1.0.5.17	
Cortward Hamo.		Property	Address		roioii.		7 01010		
Address :									
1. Overall dwelling dime	ensions:								
Ground floor			a(m²)	(1a) x		ight(m)	(2a) =	Volume(m³) (3a)
	a) . (1b) . (1a) . (1d) . (1a) (1] •		2.82	(2a) =	217.45	(3a)
	a)+(1b)+(1c)+(1d)+(1e)+(1	n)	77.11	(4)	\	I) (O)	(0.)		_
Dwelling volume				(3a)+(3b	0)+(3C)+(3C	d)+(3e)+	(3n) =	217.45	(5)
2. Ventilation rate:	main seconda	rv	other		total			m³ per hou	r
Number of chimneys	heating heating	., □ + □		7 = [40 =		_
Number of chimneys		╛╘	0	╛╘	0			0	(6a)
Number of open flues	0 + 0	+	0] = [0		20 =	0	(6b)
Number of intermittent fa				Ĺ	0		10 =	0	(7a)
Number of passive vents				<u>_</u>	0		10 =	0	(7b)
Number of flueless gas f	ires				0	X	40 =	0	(7c)
							Air ch	anges per ho	ur
Infiltration due to chimne	ys, flues and fans = (6a)+(6b)+	7a)+(7b)+((7c) =	Г	0		÷ (5) =	0	(8)
	peen carried out or is intended, proce			continue fi			. (0) –	0	
Number of storeys in t	he dwelling (ns)							0	(9)
Additional infiltration						[(9)	-1]x0.1 =	0	(10)
	.25 for steel or timber frame or resent, use the value corresponding			•	ruction			0	(11)
deducting areas of openi	_	o inc grea	ici wan arc	a (anoi					
•	floor, enter 0.2 (unsealed) or ().1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, en								0	(13)
· ·	s and doors draught stripped		0.05 [0.0) (4.4)	1001			0	(14)
Window infiltration			0.25 - [0.2		_	. (15) -		0	(15)
Infiltration rate	aEO overseed in subject mate	00 nor h			12) + (13)		oroo	0	(16)
•	q50, expressed in cubic metr lity value, then $(18) = [(17) \div 20] +$	-	•	•	ietre or e	rivelope	area	3	(17)
·	es if a pressurisation test has been do				is being u	sed		0.15	(18)
Number of sides sheltere		·	,	,	J			2	(19)
Shelter factor			(20) = 1 -	[0.075 x (19)] =			0.85	(20)
Infiltration rate incorpora	ting shelter factor		(21) = (18) x (20) =				0.13	(21)
Infiltration rate modified f	or monthly wind speed								
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Table 7								
(22)m= 5.1 5	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2	2)m ∸ 4								
(22a)m = 1.27 1.25	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
			1					I	

-ujusteu iriiliti	ation rate (allov	ving for sh	nelter an	nd wind s	peed) =	(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		
	_	rate for t	he appli	cable ca	se		-	-	-	-		1/20
		pendix N. (2	3b) = (23a	a) × Fmv (e	equation (I	N5)) . othe	rwise (23b) = (23a)				(23
			, ,	,	. `	,, .	`	, (===,				===
	•	•	ŭ		`		,	2h\m + (23h) √ [′	1 _ (23c)		(20
· ·		1 1		0.25	• `	- ^ `	``	– `	0.27	``]	(24
	d mechanical v	 /entilation	without	heat rec	overv (N	I MV) (24h)m = (22	2b)m + (:	L 23h)	<u> </u>	J	
24b)m= 0	0 0	0	0	0	0	0	0	0	0	0	1	(24
c) If whole h			•	•				ļ	ļ	ļ	ı	
<u> </u>	 	then (24d	c) = (23b)	i ı	vise (24	c) = (22b)	o) m + 0.	5 × (23b			1	
24c)m= 0	0 0	0	0	0	0	0	0	0	0	0		(24
,				•				0.5]				
24d)m= 0	0 0	0	0	0	0	0	0	0	0	0		(24
Effective air	change rate - 6	enter (24a) or (24k	o) or (24d	c) or (24	d) in box	(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		(2
3 Heat losses	s and heat loss	paramete	ir.									
If mechanical ventilation:		A X k										
loore	area (m²)	111	-		_			,	<u> </u>	KJ/IIII	^	KJ/K (2
	<u>.</u> 1				_		!		닄			(2
				2.9	^'	/[/ - /		.3 04				
				5.45	= ,,	/[1// 1 / 1 / 1	l l					•
Nindowo Tyno					=		0.04] =	7.23				(2
	3			1.99	x1	/[1/(1.4)+	0.04] = [0.04] = [7.23 2.64				(2
Vindows Type	e 3 e 4			1.99	x1 x1	/[1/(1.4)+ /[1/(1.4)+	0.04] = $\begin{bmatrix} 0.04 \end{bmatrix}$ = $\begin{bmatrix} 0.04 \end{bmatrix}$ = $\begin{bmatrix} 0.04 \end{bmatrix}$	7.23 2.64 1.19				(2
Vindows Type Vindows Type	e 3 e 4 e 5			1.99 0.9 0.62	x1 x1 x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = [0.04] = [0.04] = [0.04] = [7.23 2.64 1.19 0.82				(2 (2 (2
Vindows Type Vindows Type Vindows Type	e 3 e 4 e 5 e 6			1.99 0.9 0.62	x1 x1 x1 x1 x1 x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [7.23 2.64 1.19 0.82 2.64				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
Vindows Type Vindows Type Vindows Type Vindows Type	e 3 e 4 e 5 e 6 e 7			1.99 0.9 0.62 1.99	x1 x1 x1 x1 x1 x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [7.23 2.64 1.19 0.82 2.64				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type	e 3 e 4 e 5 e 6 e 7			1.99 0.9 0.62 1.99	x1 x1 x1 x1 x1 x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [7.23 2.64 1.19 0.82 2.64 1.19				(2 (2 (2 (2 (2 (2
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type	e 3 e 4 e 5 e 6 e 7 e 8	22.15	5	1.99 0.9 0.62 1.99 0.9	x1 x1 x1 x1 x1 x1 x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = $\begin{bmatrix} 0.04 \end{bmatrix}$	7.23 2.64 1.19 0.82 2.64 1.19				(2 (2 (2 (2 (2 (2
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1	9 3 9 4 9 5 9 6 9 7 9 8		5	1.99 0.9 0.62 1.99 0.9 1.99	x1 x1 x1 x1 x1 x1 x1 x1 x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1 Valls Type2	9 3 9 4 9 5 9 6 9 7 9 8 55.53 21.38	0	5	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38	x1	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.14	0.04] = [0.04]	7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62				(2 (2 (2 (2 (2 (2 (2)
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1 Valls Type2 Valls Type3	9 3 9 4 9 5 9 6 9 7 9 8 55.53 21.38	0	5	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38	x1 x	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 	0.04] = [0.04]	7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62 0.56				(2 (2 (2 (2 (2 (2 (2 (2 (2
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1 Valls Type2 Valls Type3 Roof	9 3 9 4 9 5 9 6 9 7 9 8 55.53 21.38 2.82 77.11	0	5	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38 2.82 77.11	x1 x	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 	0.04] = [0.04]	7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62 0.56				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (3
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1 Valls Type2 Valls Type3 Roof Total area of e	9 3 9 4 9 5 9 6 9 7 9 8 55.53 21.38 2.82 77.11	0	5	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38 2.82 77.11	x1 x	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [= [= [= [= [= [= [= [= [= [7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62 0.56				(2 (2 (2 (2 (2 (2 (2 (2 (2 (3 (3 (3
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1 Valls Type2 Valls Type3 Roof Total area of e Party wall for windows and	9 3 9 4 9 5 9 6 9 7 9 8 55.53 21.38 2.82 77.11	0 0 0	ndow U-va	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38 2.82 77.11 156.84 25.17 alue calcula	x1 x1 x1 x1 x1 x1 x x1 x x x x x x x x	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.14 0.17 0.2	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [= [= [= [= [= [= [= [= [= [7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62 0.56 7.71	as given in	paragraph		(2 (2 (2 (2 (2 (2 (2 (2 (2 (3 (3 (3
Vindows Type Vindows Type Vindows Type Vindows Type Vindows Type Valls Type1 Valls Type2 Valls Type3 Roof Total area of e Party wall for windows and * include the area	9 3 9 4 9 5 9 6 9 7 9 8 55.53 21.38 2.82 77.11 elements, m ²	0 0 0	ndow U-va	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38 2.82 77.11 156.84 25.17 alue calcula	x1 x1 x1 x1 x1 x1 x x x x x x x x x x x	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.14 0.17 0.2	0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [0.04] = [= [= [= [= [= [= [= [= [= [7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62 0.56 7.71	as given in	paragraph	1 3.2 44.89	(2 (2 (2 (2 (2 (2 (2) (2) (3) (3) (3)
Windows Type Windows Type Windows Type Windows Type Windows Type Walls Type1 Walls Type2 Walls Type3 Roof Fotal area of e Party wall If for windows and It include the area Fabric heat los	2 3 4 4 5 5 6 6 7 7 8 8 55.53 21.38 2.82 77.11 elements, m²	0 0 0	ndow U-va	1.99 0.9 0.62 1.99 0.9 1.99 33.38 21.38 2.82 77.11 156.84 25.17 alue calcula	x1 x1 x1 x1 x1 x1 x x x x x x x x x x x	/[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.14 0.17 0.2 0.1	0.04] = [0.04] = [0.04	7.23 2.64 1.19 0.82 2.64 1.19 2.64 4.67 3.62 0.56 7.71				(27 (27 (27 (27 (27) (29) (29) (30) (31) (32)

can he i	ised instea	ad of a de	tailed calc	ulation										
			x Y) cal		usina Ap	pendix I	<						13.26	(36)
	J	,	are not kn		Ο.	•							10.20	(00)
Total fa	abric hea	at loss		, ,	•	,			(33) +	(36) =			58.15	(37)
Ventila	ation hea	t loss ca	alculated	monthl	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 tr	ansfer c	oefficier	nt, W/K						(39)m	= (37) + (38)m		_	
(39)m=	78.86	78.63	78.4	77.26	77.03	75.88	75.88	75.65	76.34	77.03	77.48	77.94		
Heat lo	oss para	meter (H	HLP), W/	/m²K						Average = = (39)m ÷	Sum(39) ₁ · (4)	12 /12=	77.2	(39)
(40)m=	1.02	1.02	1.02	1	1	0.98	0.98	0.98	0.99	1	1	1.01		
Numbe	er of day	rs in mor	nth (Tab	le 1a)					,	Average =	Sum(40) ₁	12 /12=	1	(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. Wa	ater heat	ing ener	rgy requi	irement:								kWh/y	ear:	
if TF	ned occu A > 13.9 A £ 13.9	9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (⁻	TFA -13		41]	(42)
Annua Reduce	l averag the annua	e hot wa al average		usage by	5% if the a	lwelling is	designed	(25 x N) to achieve		se target o		.34]	(43)
	 1	Feb	Mar	<u> </u>	<u> </u>		Jul	L	Con	Oct	Nov	Dec	1	
Hot wate	Jan er usage ir		day for ea	Apr ach month	May Vd,m = fa	Jun ctor from		Aug (43)	Sep	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	1	
(,											m(44) ₁₁₂ =		1096.04	(44)
Energy	content of	hot water	used - cal	culated m	onthly $= 4$.	190 x Vd,r	m x nm x E	OTm / 3600						
(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)
				· ·				boxes (46	, ,				1	
(46)m= Water	22.35 storage	19.55	20.17	17.59	16.87	14.56	13.49	15.48	15.67	18.26	19.93	21.64		(46)
	_		includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0	1	(47)
•		` ,	ind no ta	•			_						ı	()
	•	_			_			mbi boil	ers) ente	er '0' in (47)			
	storage												•	
,			eclared I		or is kno	wn (kWł	n/day):					0]	(48)
•			m Table									0		(49)
•			storage eclared o	-		or is not	known:	(48) x (49)) =		1	10		(50)
Hot wa	ater stora	age loss	factor free sections	om Tabl							0.	02]	(51)
	e factor	_		UII 7.U							1	.03	1	(52)
			m Table	2b							-	.6	1	(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)
molude (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	(66)
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 (calculation (67)m= 19.02 16.89 Appliances gains (calculation (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 (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	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 c (Table 5a 0 on (negative -96.23 cable 5) 119.53	Appendix 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	x	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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Northwe	est _{0.9x}	0.77	x	0.	62	x	9	91.1	x	0.4	x	0.8	=	12.53	(81)
Northwe	est _{0.9x}	0.77	x	1.	99	x	7	2.63	x	0.4	x	0.8		64.1	(81)
Northwe	est _{0.9x}	0.77	x	0	.9	x	7	2.63	x	0.4	x	0.8	_ =	14.5	(81)
Northwe	est _{0.9x}	0.77	x	0.	62	x	7	2.63	x	0.4	x	0.8	_ =	9.99	(81)
Northwe	est _{0.9x}	0.77	x	1.	99	x	5	0.42	x	0.4	×	0.8	_ =	44.5	(81)
Northwe	est _{0.9x}	0.77	х	0	.9	X	5	0.42	x	0.4	x	0.8		10.06	(81)
Northwe	est _{0.9x}	0.77	х	0.	62	x	5	0.42	x	0.4	x	0.8	<u> </u>	6.93	(81)
Northwe	est _{0.9x}	0.77	x	1.	99	x	2	8.07	x	0.4	x	0.8	=	24.77	(81)
Northwe	est _{0.9x}	0.77	х	0	.9	X	2	8.07	x	0.4	X	0.8		5.6	(81)
Northwe	est _{0.9x}	0.77	x	0.	62	X	2	8.07	X	0.4	X	0.8	=	3.86	(81)
Northwe	est _{0.9x}	0.77	х	1.	99	X		14.2	x	0.4	X	0.8	=	12.53	(81)
Northwe	est _{0.9x}	0.77	х	0	.9	X	,	14.2	X	0.4	X	0.8	=	2.83	(81)
Northwe	est _{0.9x}	0.77	х	0.	62	X		14.2	x	0.4	X	0.8	=	1.95	(81)
Northwe	est _{0.9x}	0.77	х	1.	99	X	(9.21	x	0.4	X	0.8	=	8.13	(81)
Northwe	est _{0.9x}	0.77	X	0	.9	X	9	9.21	X	0.4	X	0.8	=	1.84	(81)
Northwe	est _{0.9x}	0.77	х	0.	62	X	(9.21	x	0.4	X	0.8	=	1.27	(81)
Solar g	ains in	watts, ca	alculated	d for eac	h mont	h			(83)m	n = Sum(74)m	(82)m	l			
(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 g	ains – ir	nternal a	nd sola	r (84)m	= (73)m	+ (83)m	, watts						_	
(84)m=	535.22	622.27	701.87	780.04	831.76	8	18.73	783.36	732	.89 675.78	596.5	4 530.24	506.51	7	(84)
										I					
7. Me	an inter	nal temp	erature	(heating	n seaso	n)			1						
		nal temp			_		area f	from Tal	ole 9	Th1 (°C)				21	(85)
Temp	erature	during h	eating p	eriods i	n the liv	ing			ole 9	, Th1 (°C)				21	(85)
Temp	erature ition fac	during h	neating pains for	eriods i	n the liv	ring m (s	ee Ta	ble 9a)			Oc	t Nov	Dec		(85)
Temp	erature	during h	eating p	eriods i	n the liv	ring m (s				ug Sep	Oc 0.94		Dec 1		(85)
Temp Utilisa (86)m=	erature ation fac Jan 1	during h tor for g Feb 0.99	neating pains for Mar	eriods i living ar Apr 0.91	n the livea, h1,r May	ring m (s	ee Ta Jun ^{0.58}	ble 9a) Jul 0.42	A 0.4	ug Sep 17 0.73	+	+			
Temp Utilisa (86)m=	erature ation fac Jan 1 interna	during h tor for ga Feb 0.99	neating pains for Mar 0.97	periods i living ar Apr 0.91 living a	n the lives a, h1,r May 0.78	ring m (s	ee Ta Jun ^{0.58} w ste	ble 9a) Jul 0.42 ps 3 to 7	A 0.4 7 in T	ug Sep 17 0.73 Table 9c)	0.94	0.99	1		(86)
Temp Utilisa (86)m=	erature ation fac Jan 1	during h tor for g Feb 0.99	neating pains for Mar	eriods i living ar Apr 0.91	n the livea, h1,r May	ring m (s	ee Ta Jun ^{0.58}	ble 9a) Jul 0.42	A 0.4	ug Sep 17 0.73 Table 9c)	+	0.99			
Temp Utilisa (86)m= Mean (87)m=	erature ation fac Jan 1 internal 20.02	during h tor for gar Feb 0.99 I temper 20.19	eating pains for Mar 0.97 ature in 20.43	living ar O.91 living ar O.91 living ar 20.72	n the lives n the	ring m (s follo	ee Ta Jun 0.58 w ste	ble 9a) Jul 0.42 ps 3 to 7	7 in T	ug Sep 17 0.73 Table 9c)	0.94	0.99	1		(86)
Temp Utilisa (86)m= Mean (87)m=	erature ation fac Jan 1 internal 20.02	during h tor for gar Feb 0.99 I temper 20.19	eating pains for Mar 0.97 ature in 20.43	living ar O.91 living ar O.91 living ar 20.72	n the lives n the	ring m (s follo	ee Ta Jun 0.58 w ste	ble 9a) Jul 0.42 ps 3 to 7	7 in T	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C)	0.94	0.99	1		(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m=	erature ation fac Jan 1 internal 20.02 erature 20.06	during h tor for ga Feb 0.99 I temper 20.19 during h	meating pains for Mar 0.97 ature in 20.43 meating part 20.07	living ar 0.91 living ar 20.72 periods i	n the lives n the	ring m (s	ee Ta Jun 0.58 w ste 0.99 relling 20.1	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1	A 0.47 in T 2 able 9	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C)	0.94	0.99	19.99		(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m=	erature ation fac Jan 1 internal 20.02 erature 20.06	during h tor for gar Feb 0.99 I temper 20.19 during h	meating pains for Mar 0.97 ature in 20.43 meating part 20.07	living ar 0.91 living ar 20.72 periods i	n the lives n the	ring m (s	ee Ta Jun 0.58 w ste 0.99 relling 20.1	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1	A 0.47 in T 2 able 9	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C) 1 20.09	0.94	0.99 20.31 3 20.08	19.99		(86)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99	during heter for games for for gam	meating pains for Mar 0.97 ature in 20.43 neating part 20.07 ains for 0.96	living ar O.91 living ar 20.72 periods i 20.08 rest of c 0.89	n the lives a, h1,r May 0.78 rea T1 (20.91 n rest o 20.08 dwelling 0.73	ring m (s	un 0.58 w ste 20.99 velling 20.1 m (se 0.5	Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34	A 0.4 7 in T 2 able 9 9a) 0.3	ug Sep 17 0.73 Table 9c) 1 20.96 2, Th2 (°C) 1 20.09	20.77	0.99 20.31 3 20.08	19.99		(86) (87) (88)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99	during heter for games for for gam	meating pains for Mar 0.97 ature in 20.43 neating part 20.07 ains for 0.96	living ar O.91 living ar 20.72 periods i 20.08 rest of c 0.89	n the lives a, h1,r May 0.78 rea T1 (20.91 n rest o 20.08 dwelling 0.73	ring m (s	un 0.58 w ste 20.99 velling 20.1 m (se 0.5	Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34	A 0.4 7 in T 2 able 9 9a) 0.3	ug Sep 17 0.73 Table 9c) 1 20.96 1 20.09 1 20.09 1 20.09 1 20.09	20.77	0.99 20.31 3 20.08 0.99	19.99		(86) (87) (88)
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Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99 internal 18.77	during heter for grand from 19.01 during heter 20.19 during heter 20.07 tor for grand 19.01	neating pains for Mar 0.97 ature in 20.43 neating pains for 0.96 ature in 19.36	living ar Apr 0.91 living ar 20.72 periods if 20.08 rest of company of the rest 19.77 or the will are the company of the will are the company of the	n the live ea, h1,r May 0.78 rea T1 (20.91 n rest o 20.08 dwelling 0.73 of dwel 20.01	ring m (s follo	ee Ta Jun 0.58 w ste 20.99 velling 20.1 m (se 0.5 T2 (fo 20.09	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34 collow ste 20.1 A × T1	9a) 0.3 20 + (1	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C) 1 20.09 18 0.65 10 7 in Tab 1 20.06 - fLA) × T2	0.94 20.77 20.06 0.92 0.92 0.92 19.73 fLA = Li	0.99 20.31 3 20.08 0.99 5 19.2 ving area ÷ (-	1 19.99 20.07 1 18.73 4) =		(86) (87) (88) (89) (90) (91)
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Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99 internal 18.77 internal 19.22 adjustn	during heter for grand from tor for grand from grand fr	meating pains for Mar 0.97 ature in 20.43 meating pains for 0.96 ature in 19.36 ature (for 19.74 the mean	living ar Apr 0.91 living ar 20.72 periods if 20.08 rest of company of the rest 19.77 or the will 20.11 n internal	n the live ea, h1,r May 0.78 rea T1 (20.91 n rest o 20.08 dwelling 0.73 of dwel 20.01 nole dwel 20.33 al tempe	ring m (s follo	ee Ta Jun 0.58 w ste 20.99 velling 20.1 m (se 0.5 T2 (fo 20.09) g) = fl 20.41 ure fro	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34 collow ste 20.1 A × T1 20.42 m Table	9a) 0.3 eps 3 20 + (1 20. e) 4e,	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C) 1 20.09 88 0.65 to 7 in Tab 1 20.06 - fLA) × T2 42 20.38 where appress	0.94 20.7 20.00 0.92 0.92 0.92 19.75 fLA = Li 20.00 copriate	0.99 20.31 3 20.08 0.99 5 19.2 ving area ÷ (1 19.99 20.07 1 18.73 4) =		(86) (87) (88) (89) (90) (91)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m=	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99 internal 18.77 internal 19.22 adjustn 19.22	during heter for gradual from for gradua	neating pains for Mar 0.97 ature in 20.43 neating pains for 0.96 ature in 19.36 ature (for 19.74 he mean 19.74	living ar Apr 0.91 living ar 20.72 periods i 20.08 rest of c 0.89 the rest 19.77 or the will 20.11 in internal	n the live ea, h1,r May 0.78 rea T1 (20.91 n rest o 20.08 dwelling 0.73 ref dwelling 20.01	ring m (s follo	ee Ta Jun 0.58 w ste 20.99 velling 20.1 m (se 20.09 g) = fl	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34 collow ste 20.1 A × T1 20.42	A A 0.4 7 in T 2 20 9a) 0.3 eps 3 20 + (1 20.	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C) 1 20.09 88 0.65 to 7 in Tab 1 20.06 - fLA) × T2 42 20.38 where appress	0.94 20.7 20.06 0.92 0.92 19.75 fLA = Li	0.99 20.31 3 20.08 0.99 5 19.2 ving area ÷ (1 19.99 20.07 1 18.73 4) =		(86) (87) (88) (89) (90) (91)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spa	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99 internal 18.77 internal 19.22 adjustn 19.22 ace hear	during heter for grant for for grant for grant for grant for grant for grant for for gra	meating pains for Mar 0.97 ature in 20.43 meating pains for 0.96 ature in 19.36 ature (for 19.74 the mean 19.74 uirement	living ar Apr 0.91 living ar 20.72 periods if 20.08 rest of company of the rest 19.77 or the wing 20.11 in internal 20.11	n the lives a, h1,r May 0.78 rea T1 (constraint of the lives of the li	ring m (s follo	ee Ta Jun 0.58 w ste 20.99 velling 20.1 m (se 0.5 T2 (fo 20.09) g) = fl 20.41 ure fro 20.41	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34 ollow ste 20.1 A × T1 20.42 m Table 20.42	9a) 0.3 20 + (1 20. 20. 20.	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C) 1 20.09 18 0.65 10 7 in Tab 1 20.06 - fLA) × T2 42 20.38 where appress 42 20.38	0.94 20.7 20.00 0.92 0.92 0.92 19.75 fLA = Li 20.00 copriate 20.00	0.99 20.31 3 20.08 0.99 5 19.2 ving area ÷ (19.99 20.07 1 18.73 4) =	0.36	(86) (87) (88) (89) (90) (91)
Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spa	erature ation fac Jan 1 internal 20.02 erature 20.06 ation fac 0.99 internal 18.77 internal 19.22 adjustn 19.22 ace hea to the r	during heter for grant for for grant for grant for grant for grant for grant for for gra	neating pains for Mar 0.97 ature in 20.43 neating pains for 0.96 ature in 19.36 ature (for 19.74 the mean 19.74 uirementernal te	living ar Apr 0.91 living ar 20.72 periods i 20.08 rest of c 0.89 the rest 19.77 or the will 20.11 n internal 20.11	n the live ea, h1,r May 0.78 rea T1 (20.91 n rest o 20.08 dwelling 0.73 rof dwelling 20.01 nole dwelling 20.33 al tempe 20.33	ring m (s follo	ee Ta Jun 0.58 w ste 20.99 velling 20.1 m (se 0.5 T2 (fo 20.09) g) = fl 20.41 ure fro 20.41	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.1 ee Table 0.34 ollow ste 20.1 A × T1 20.42 m Table 20.42	9a) 0.3 20 + (1 20. 20. 20.	ug Sep 17 0.73 Table 9c) 1 20.96 9, Th2 (°C) 1 20.09 88 0.65 to 7 in Tab 1 20.06 - fLA) × T2 42 20.38 where appress	0.94 20.7 20.00 0.92 0.92 0.92 19.75 fLA = Li 20.00 copriate 20.00	0.99 20.31 3 20.08 0.99 5 19.2 ving area ÷ (19.99 20.07 1 18.73 4) =	0.36	(86) (87) (88) (89) (90) (91)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Litilization factor for gains, hm:							
Utilisation factor for gains, hm: (94)m=	0.41	0.68	0.92	0.98	0.99		(94)
Useful gains, hmGm , W = (94)m x (84)m	V	0.00	0.02	0.00	0.00		(- /
(95)m= 531.44 612.31 673.88 693.91 616 434.79 289.11	302.88 4	457.34	549.41	521.88	503.79		(95)
Monthly average external temperature from Table 8	<u> </u>						
(96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat loss rate for mean internal temperature, Lm , W =[(39)m :	x [(93)m- ((96)m]					
(97)m= 1176.16 1142.56 1038.33 866 664.79 440.84 289.74		479.41	731.07	968.03	1167.86		(97)
Space heating requirement for each month, kWh/month = 0.02 (98)m= 479.67 356.33 271.15 123.91 36.3 0 0					104.07		
(98)m= 479.67 356.33 271.15 123.91 36.3 0 0	0 Total p	0	135.15	321.23) = Sum(9	494.07	2217.81	(98)
0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	rotal pi	bei yeai (i	Kvvii/yeai) = Sum(9	O)15,912 =		=
Space heating requirement in kWh/m²/year						28.76	(99)
9b. Energy requirements – Community heating scheme							
This part is used for space heating, space cooling or water heat Fraction of space heat from secondary/supplementary heating (.	•		unity sch	neme. [0	(301)
	Table 11)	0 11 110	,,,,,]		===
Fraction of space heat from community system 1 – (301) =						1	(302)
The community scheme may obtain heat from several sources. The procedure includes boilers, heat pumps, geothermal and waste heat from power stations.			p to four (other heat	sources; th	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 commu	unitv heatir	na svste	em		[1	(305)
Distribution loss factor (Table 12c) for community heating system					l [1.05	(306)
					[
Distribution loss factor (Table 12c) for community heating system					! []	1.05	
Distribution loss factor (Table 12c) for community heating system Space heating	m			5) x (306) :	 -	1.05 kWh/ye	
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement	m (S	98) x (30	4a) x (305		 - 	1.05 kWh/ye 2217.81	ar
Distribution loss factor (Table 12c) for community heating system Space heating Annual space heating requirement Space heat from Community heat pump	m (9 om Table 4	98) x (30	4a) x (309 opendix	E)	 - 	1.05 kWh/ye 2217.81 2328.7	(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)	m (9 om Table 4	98) x (30- 1a or Ap	4a) x (309 opendix	E)	 - - 	1.05 kWh/ye 2217.81 2328.7	(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	m (9 om Table 4	98) x (30- 1a or Ap	4a) x (309 opendix	E)	 - 	1.05 kWh/ye 2217.81 2328.7	(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:	m (9 om Table 4 dem (9	98) x (304 1a or Ap 98) x (304	4a) x (305 opendix 1) x 100 -	E) - (308) =	[1.05 kWh/ye 2217.81 2328.7 0 0 2087.92	(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	m (9) om Table 4 tem (9)	98) x (304) 1a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305	E) :- (308) = :- (306) :- (306	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31	(307a) (308 (309) (310a)
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	m (9) om Table 4 tem (9)	98) x (304) 1a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305	E) - (308) =	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92	(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	m (9) om Table 4 tem (9)	98) x (304) 1a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305	E) :- (308) = :- (306) :- (306	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31	(307a) (308 (309) (310a)
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	m (9) om Table 4 dem (9) (6) 0.01 ×	98) x (304) 1a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305 .(307e) +	E) :- (308) = :- (306) :- (306	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31 45.21	(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	m (9) m Table 4 dem (9) (6) 0.01 ×	98) x (304) 4a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305 .(307e) +	E) :- (308) = :- (306) :- (306	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31 45.21 0	(307a) (308 (308 (309) (310a) (313) (314)
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 Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f):	m (9) m Table 4 dem (9) (6) 0.01 ×	98) x (304) 4a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305 .(307e) +	E) :- (308) = :- (306) :- (306	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31 45.21 0 0	(307a) (307a) (308 (309) (310a) (313) (314) (315)
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 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	m (9) m Table 4 dem (9) (6) 0.01 ×	98) x (304) 4a or Ap 98) x (304) 64) x (304)	4a) x (305 opendix 1) x 100 - 3a) x (305 .(307e) +	E) :- (308) = :- (306) :- (306	 - -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31 45.21 0 0 202.28	(307a) (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 in % (from Space heating requirement from secondary/supplementary system in % (from Space heating requirement from secondary/supplementary system in the string system in the secondary/supplementary system in the string system in the secondary/supplementary system in the secondary system in the secondary system in the secondary system in the secondary sy	om Table 4 tem (9 0.01 x	98) x (304) 4a or Ap 98) x (304) 64) x (304)	4a) x (308 opendix 1) x 100 ÷ 3a) x (308 .(307e) + (314) =	E) ÷ (308) = 5) x (306) = (310a)(- -	1.05 kWh/ye 2217.81 2328.7 0 0 2087.92 2192.31 45.21 0 0 202.28 0	(307a) (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) =5059.12 (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)612.64 0.52 Electrical energy for heat distribution [(313) x (372)0.52 23.46 Total CO2 associated with community systems (363)...(366) + (368)...(372)(373)636.1 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)636.1 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)915.38 **Dwelling CO2 Emission Rate** $(383) \div (4) =$ (384)11.87

El rating (section 14)

(385)

89.95

		l Iser F	Details:						
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012	- 036 1 L	Strom Softwa					0036639 on: 1.0.5.17	
		Property	Address		0.0111				
Address :									
1. Overall dwelling dime	ensions:	_							
Ground floor			a(m²) 77.11	(1a) x		ight(m) :.82	(2a) =	Volume(m ²	3) (3a)
	a) . (1b) . (1a) . (1d) . (1a) (1] •		02	(2a) –	217.45	(Ja)
	a)+(1b)+(1c)+(1d)+(1e)+(1	n) <u>7</u>	77.11	(4)	\	I) (O)	(0.)		_
Dwelling volume				(3a)+(3b)+(3c)+(3c	d)+(3e)+	.(3n) =	217.45	(5)
2. Ventilation rate:	main seconda	r\/	other		total			m³ per hou	ır
	heating heating	· 	Other	- F	totai		40	m per noc	_
Number of chimneys	0 + 0	_ + <u> </u>	0	_ = [0		40 =	0	(6a)
Number of open flues	0 + 0	+	0	_ = [0	x 2	20 =	0	(6b)
Number of intermittent fa	ns				3	x ′	10 =	30	(7a)
Number of passive vents					0	x ′	10 =	0	(7b)
Number of flueless gas fi	ires			Ī	0	x 4	40 =	0	(7c)
				_					
				_			Air ch	nanges per ho	our —
'	ys, flues and fans = (6a)+(6b)+(aantinua fi	30		÷ (5) =	0.14	(8)
Number of storeys in the	een carried out or is intended, procee he dwelling (ns)	ea 10 (17),	otrierwise	conunue ii	om (9) to	(10)		0	(9)
Additional infiltration	g (,					[(9)-	-1]x0.1 =	0	(10)
Structural infiltration: 0	.25 for steel or timber frame o	r 0.35 fo	r masoni	ry consti	ruction			0	(11)
if both types of wall are padeducting areas of openia	resent, use the value corresponding t	o the grea	ter wall are	a (after					
,	floor, enter 0.2 (unsealed) or 0).1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, en	,	`	,,					0	(13)
Percentage of windows	s and doors draught stripped							0	(14)
Window infiltration			0.25 - [0.2	2 x (14) ÷ 1	100] =			0	(15)
Infiltration rate			(8) + (10)					0	(16)
•	q50, expressed in cubic metro	•		•	etre of e	envelope	area	5	(17)
•	lity value, then $(18) = [(17) \div 20] + (18)$ if a pressurisation test has been do				is haina u	sad		0.39	(18)
Number of sides sheltere		ne or a de	gree an pe	тпеаышу	is being u	seu		2	(19)
Shelter factor			(20) = 1 -	[0.075 x (19)] =			0.85	(20)
Infiltration rate incorporat	ting shelter factor		(21) = (18	s) x (20) =				0.33	(21)
Infiltration rate modified f	or monthly wind speed								
Jan Feb	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	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								
	1.23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18]	
		1	1	<u> </u>				J	

Adjusted infiltra	ation rate (allo	wing for sl	nelter an	nd wind sp	eed) =	(21a) x	(22a)m					
0.42	0.41 0.4	0.36	0.35	0.31	0.31	0.31	0.33	0.35	0.37	0.39		
Calcul ate effec If mechanica	-	e rate for t	he appli	icable cas	е	•						
	at pump using A	nnendix N (2	(23a) = (23a	a) x Fmv (ec	uation (I	N5)) othe	rwise (23h) = (23a)			0	(23:
	heat recovery: e		, ,	, ,	. `	,, .	`) = (20 0)			0	(23
	d mechanical	•	ŭ		,		,	2h\m + (23h) ~ [·	1 _ (23c)		(23
(24a)m= 0	0 0	0	0	0	0	0	0	0	0	0]	(24
	d mechanical	ventilation	<u> </u>	heat reco	verv (N	I MV) (24t)m = (22	2b)m + (L 23b)	<u> </u>	J	
(24b)m= 0	0 0	0	0	0	0	0	0	0	0	0]	(24
,	ouse extract v		•	•				F (22h	.\	1	ı	
$\frac{11 (220)11}{(24c)m} = 0$	$\frac{1 < 0.5 \times (23b)}{0}$), then (24)	$\frac{(231)}{0}$	$\int_{0}^{\infty} \int$	0	$\frac{C}{C} = (22)$	0	.5 × (23L	0	0	1	(24
· · L	ventilation or v								0		J	(2-1
,	7entilation of v n = 1, then (24		•	•				0.5]				
(24d)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		(24
Effective air	change rate -	enter (24a) or (24l	b) or (24c)	or (24	d) in bo	· (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]	(25
3. Heat losses	and heat log	e paramet	or:	•		•						
ELEMENT	Gross	Openin		Net Are	a	U-val	IE	AXU		k-value	a	ΑΧk
	area (m²)	r		A ,m		W/m2		(W/I	K)	kJ/m²-		kJ/K
Doors				2.52	X	1	= [2.52				(26
Windows Type	1			2.48	_x 1	/[1/(1.4)+	0.04] =	3.29				(27
Windows Type	2			4.65	_x 1	/[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	6			1.7	x1	/[1/(1.4)+	0.04] =	2.25				(27
Windows Type	7			0.77	x1	/[1/(1.4)+	0.04] =	1.02	冒			(27
Windows Type	8			1.7	= _{x1}	/[1/(1.4)+	0.04] =	2.25	=			(27
Walls Type1	55.53	19.2	9	36.24	= x	0.18		6.52	=			(29
Walls Type2	21.38	0		21.38	= x	0.18	≓ <u>-</u> ¦	3.85	=		7 F	(29
Walls Type3	2.82	0	=	2.82	x	0.18	≓	0.51	=		i i	(29
Roof	77.11	0	=	77.11	X	0.13	-	10.02	륵 ;		╡	(30
Total area of el		Ū		156.84	╡ ^	0.10		10.02				(31
Party wall	omonto, m				\dashv \checkmark			0				(32
* for windows and ** include the area					x ted using	0 g formula 1		0 ie)+0.04] a	as given in	paragrapl		(\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\
Fabric heat los			ы ана раг	aaons		(26)(30) + (32) =				45.66	(33
	,	•						(30) + (32	2) ± (32a)	(32e) =		=
Heat capacity ($JM = S(A \times K)$)					((20)	(50) 1 (52	c) i (32a).	(020) -		11,34
Heat capacity (Thermal mass	•		: TFA) ir	n kJ/m²K				tive Value	, , ,	(020) =	250	(34

	used instea						_							_
	al bridge	,	,		Ο.	•	<						10.27	(36
	of therma abric hea		are not kn	own (36) =	= 0.05 x (3	11)			(33) +	(36) =			55.93	(37
	ation hea		alculated	l monthly	V					•	25)m x (5)		55.95	(3/
Ortino	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
leat tr	ransfer c	nefficier	nt W/K			l	l		(39)m	= (37) + (37)	1			
39)m=	98.15	97.9	97.66	96.53	96.32	95.33	95.33	95.15	95.71	96.32	96.75	97.19		
•						<u> </u>	<u> </u>			L Average =	Sum(39) ₁ .	12 /12=	96.53	(39
leat lo	oss para	meter (F	HLP), W/	/m²K					(40)m	= (39)m ÷	(4)			
40)m=	1.27	1.27	1.27	1.25	1.25	1.24	1.24	1.23	1.24	1.25	1.25	1.26		–
Jumbe	er of day	s in mor	nth (Tab	le 1a)					,	Average =	Sum(40) ₁ .	12 /12=	1.25	(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		(4
				<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>!</u>		<u> </u>	<u> </u>			
4 \ <i>\</i> /;	ater heat	ing ener	av regui	irement:								kWh/ye	ear:	
T. VVC	ator riout	ing choi	gy roqui	nomont.								KVVIII y		
	ned occu			. [4	/ 0 0000) 40 (TF	-)O)1 . O (0040 · · /	TEA 40		41		(4
	·A > 13.9 ·A £ 13.9		+ 1.76 X	[1 - exp	(-0.0003	349 x (11	-A -13.9)2)] + 0.0)013 x (IFA -13.	.9)			
		•	ater usad	ge in litre	es per da	av Vd.av	erage =	(25 x N)	+ 36		91	.34		(4
educe	the annua	l average	hot water	usage by	5% if the a	lwelling is	designed	to achieve		se target o				
ot more	e that 125	litres per j	person per	r day (all w	ater use, I	not and co	la) 						Ī	
o4o4	Jan er usage ir	Feb	Mar	Apr	May	Jun	Jul Table 10 Y	Aug	Sep	Oct	Nov	Dec		
		•	,				ı	· <i>′</i>		<u> </u>	1		1	
4)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		٦,,
nergy (content of	hot water	used - cal	culated mo	onthly = 4 .	190 x Vd,r	m x nm x E	OTm / 3600			m(44) ₁₁₂ = ables 1b, 1		1096.04	(4
5)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		
O)	1 10.00	100.01	10 1.11	111.20	112.10	07.07	00.00	100.22			m(45) ₁₁₂ =		1437.08	- 1.
	taneous w	ater heatii	ng at point	of use (no	hot water	r storage)								1(4
instan				0. 0.00 (Tiol water	otorago),	enter 0 in	boxes (46)) to (61)					(4
	22.35	19.55	20.17	17.59	16.87	14.56	13.49	boxes (46) 15.48) to (61) 15.67	18.26	19.93	21.64		_
6)m= /ater	22.35 storage	19.55 loss:		17.59	16.87	14.56	13.49	15.48	15.67	18.26	19.93	21.64		_
6)m= /ater	22.35 storage	19.55 loss:		17.59	16.87	14.56	13.49		15.67	18.26	<u> </u>	21.64 150		(4
6)m= /ater torag comi	22.35 storage je volum munity h	19.55 loss: e (litres) eating a	includin	17.59 ng any so	16.87 olar or W	14.56 /WHRS	13.49 storage	15.48 within sa (47)	15.67 ame ves	18.26 sel				(4
6)m= /ater torag comi therv	22.35 storage ge volume munity h	19.55 loss: e (litres) eating a	includin	17.59 ng any so	16.87 olar or W	14.56 /WHRS	13.49 storage	15.48 within sa	15.67 ame ves	18.26 sel				(4
6)m= /ater torag comi therv /ater	storage ge volume munity h vise if no storage	19.55 loss: e (litres) eating a o stored loss:	includin nd no ta hot wate	17.59 ng any so nk in dw er (this in	16.87 olar or W velling, e	14.56 /WHRS Inter 110	13.49 storage litres in neous co	15.48 within sa (47)	15.67 ame ves	18.26 sel	47)	150		(4
6)m= /ater torag completer /ater / If m	storage ge volume munity h vise if no storage nanufacti	19.55 loss: e (litres) eating a stored loss: urer's de	includin nd no ta hot wate	17.59 Ing any so ank in dwer (this in oss factor)	16.87 olar or W velling, e	14.56 /WHRS Inter 110	13.49 storage litres in neous co	15.48 within sa (47)	15.67 ame ves	18.26 sel	47)	150		(4 (4
Vater torag comily therw vater a) If memperson	storage per volument wise if no storage manufactive rature fa	19.55 loss: e (litres) eating a stored loss: urer's de	includin nd no ta hot wate eclared le m Table	17.59 Ing any so ank in dwer (this in oss factor 2b	16.87 olar or W velling, e ncludes i	14.56 /WHRS Inter 110	storage litres in neous co n/day):	15.48 within sa (47) ombi boil	15.67 ame ves	18.26 sel	47)	150 39 54		(4 (4 (4 (4
6)m= /ater torag completherv /ater a) If m empe	storage ge volume munity h vise if no storage nanufacti	19.55 loss: e (litres) eating a stored loss: urer's de actor fro m water	includir nd no ta hot wate eclared le m Table storage	17.59 Ing any so ank in dwer (this in oss factor 2b	16.87 Dlar or Worelling, encludes in the control of the control o	14.56 /WHRS Inter 110 Instantar wn (kWh	storage litres in neous co n/day):	15.48 within sa (47)	15.67 ame ves	18.26 sel	47)	150		(4 (4 (4 (4
Vater storage coming the value of the value	storage ye voluments if no storage nanufactive rature far y lost from anufactivater storage	19.55 loss: e (litres) eating a stored loss: urer's de actor fro m water urer's de	including the in	17.59 Ing any so ank in dwer (this in oss factor 2b) RykWh/ye cylinder I com Tabl	olar or W velling, e ncludes i or is kno	14.56 /WHRS enter 110 nstantar wn (kWh	storage litres in neous con/day):	15.48 within sa (47) ombi boil	15.67 ame ves	18.26 sel	47) 1. 0. 0.	150 39 54		(4) (4) (4) (5)
46)m= Vater Storag f comi Otherv Vater a) If m empe Energy b) If m Hot wa	storage pe voluments if no storage nanufaction anufaction anufaction anufaction anufaction anufaction anufaction anufaction atter storage munity h	19.55 loss: e (litres) eating a stored loss: urer's de actor fro m water urer's de age loss eating s	including the material representation in the material represen	17.59 Ing any so ank in dwer (this in oss factor 2b) RykWh/ye cylinder I com Tabl	olar or W velling, e ncludes i or is kno	14.56 /WHRS enter 110 nstantar wn (kWh	storage litres in neous con/day):	15.48 within sa (47) ombi boil	15.67 ame ves	18.26 sel	47) 1. 0. 0.	150 39 54 75		(48 (47 (48 (49 (50
46)m= Vater Storag f comi Otherv Vater a) If m Tempe Energy b) If m Hot wa f comi	storage ye voluments if no storage nanufactive rature far y lost from anufactivater storage	19.55 loss: e (litres) eating a o stored loss: urer's de actor fro m water urer's de age loss eating s from Tai	including and no tate that water	17.59 Ing any so ank in dwer (this in oss factors, kWh/ye cylinder I from Tablon 4.3	olar or W velling, e ncludes i or is kno	14.56 /WHRS enter 110 nstantar wn (kWh	storage litres in neous con/day):	15.48 within sa (47) ombi boil	15.67 ame ves	18.26 sel	47) 1. 0. 0.	150 39 54 75		(48 (48 (47 (48 (48 (45 (55 (55 (55 (55 (55 (55 (55 (55 (55

Francisco Land francisco contante de la contante de	(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 (56)
(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	
Combi loss calculated for each month (61)m = (60) \div 365 x (4	i ı ı ı 		1 (04)
(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 í ì í	1` ′ ′
(62)m= 195.59 172.4 181.06 162.33 159.08 142.16 136.5		177.97 190.89	(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 		(62)
(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		177.97 190.89	1005.00 (64)
	Output from water heate	,	1985.69 (64)
Heat gains from water heating, kWh/month 0.25 $'$ [0.85 \times (45))m + (61)ml + ().8 x l(46)m	+ (57)m + (59)m	ı İ
	<u> </u>		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)
(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	3 71.6 70.8 77.75	80.25 85.25	(65)
	3 71.6 70.8 77.75	80.25 85.25	(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	71.6 70.8 77.75 e dwelling or hot water is f	80.25 85.25 rom community h	(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	71.6 70.8 77.75 e dwelling or hot water is f	80.25 85.25 rom community h	neating (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= 120.29 120.29 120.29 120.29 120.29 120.29 120.29	Aug Sep Oct 9 120.29 120.29 120.29	80.25 85.25 rom community h	(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= 120.29 12	Aug Sep Oct 9 120.29 120.29 , also see Table 5	80.25 85.25 rom community h	(65) neating (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= 120.29 12	Aug Sep Oct 9 120.29 120.29 12.38 15.72	80.25 85.25 rom community h	neating (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= 120.29 12	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 rom community h	(65) neating (66) (67)
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 12	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 rom community h	(65) neating (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= 120.29 12	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 rom community h Nov Dec 120.29 120.29 18.35 19.56	(65) neating (66) (67)
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 12	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 rom community h Nov Dec 120.29 120.29 18.35 19.56	(65) neating (66) (67)
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 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 rom community h Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88	(65) neating (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= 120.29 12	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 rom community h Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88	(65) neating (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= 120.29 12	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	80.25 85.25 rom community h Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 35.03	(65) heating (66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the state of the state	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	80.25 85.25 rom community h Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 35.03	(65) heating (66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the state of the state	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 35.03	(65) neating (66) (67) (68) (69) (70)
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 35.03	(65) neating (66) (67) (68) (69) (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= 120.29 12	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 35.03 3 3 3 -96.23 -96.23 111.46 114.59	(65) neating (66) (67) (68) (69) (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= 120.29 12	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 + (7	Nov Dec 120.29 120.29 18.35 19.56 189.8 203.88 35.03 35.03 3 3 3 -96.23 -96.23 111.46 114.59	(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	х	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	=	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] =	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	3	X	9	1.1	X	0.63	х	0.7	-	-	14.76	(81)
Northwest 0.9x 0.77	x	1.7	7	X	72	2.63	x	0.63	x	0.7	_ =	▫┌	75.47	(81)
Northwest 0.9x 0.77	х	0.7	7	X	72	2.63	х	0.63	x	0.7		• <u> </u>	17.09	(81)
Northwest 0.9x 0.77	х	0.5	3	X	72	2.63	x	0.63	x	0.7		· ┌	11.76	(81)
Northwest 0.9x 0.77	х	1.7	7	X	50	0.42	x	0.63	×	0.7		• T	52.39	(81)
Northwest 0.9x 0.77	х	0.7	7	X	50	0.42	х	0.63	x	0.7		• T	11.87	(81)
Northwest 0.9x 0.77	х	0.5	3	X	50	0.42	x	0.63	×	0.7			8.17	(81)
Northwest 0.9x 0.77	х	1.7	7	X	28	3.07	х	0.63	x	0.7		• T	29.16	(81)
Northwest 0.9x 0.77	х	0.7	7	X	28	3.07	х	0.63	x	0.7		· $ extstyle ext$	6.6	(81)
Northwest 0.9x 0.77	x	0.5	3	X	28	3.07	x	0.63	x	0.7		· ┌	4.55	(81)
Northwest 0.9x 0.77	х	1.7	7	X	1.	4.2	x	0.63	x	0.7		• T	14.75	(81)
Northwest 0.9x 0.77	х	0.7	7	X	1.	4.2	x	0.63	x	0.7		• 🗂	3.34	(81)
Northwest 0.9x 0.77	х	0.5	3	X	1.	4.2	x	0.63	×	0.7		• <u> </u>	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	х	0.7	7	X	9.	.21	x	0.63	×	0.7	_ =	• <u> </u>	2.17	(81)
Northwest 0.9x 0.77	x	0.5	3	X	9.	.21	x	0.63	x	0.7		• 🗀	1.49	(81)
Solar gains in watts, calcul	ated	for each	n month	า			(83)m	n = Sum(74)m .	(82)m	ı				
(83)m= 138.68 243.55 35	-	469.65	555.84	\neg	64.92	539.19	472	<u> </u>	274.4	1	117.81	1		(83)
Total gains – internal and s									<u> </u>					, ,
(84)m= 549.78 652.62 748	_	844.44	909.14	-	97.48	858.24	797	.78 728.62	631.5	4 549.13	517.93	<u> </u>		(84)
(0+)/// 040.70 002.02 740	,.00	014.44	000.14	<u> </u>	07.40	000.24	1 , , ,	.70 720.02	001.0	7 0 0 0 1 0	017.50			(0.)
7. Mean internal temperature (heating season)														
· · · · · · · · · · · · · · · · · · ·														
7. Mean internal temperate Temperature during heati					area fr	rom Tal	ole 9	, Th1 (°C)					21	(85)
· · · · · · · · · · · · · · · · · · ·	ng pe	eriods in	the liv	ing			ole 9	, Th1 (°C)					21	(85)
Temperature during heati Utilisation factor for gains	ng pe	eriods in	the liv	ing n (s				, Th1 (°C)	Ос	t Nov	Dec		21	(85)
Temperature during heati Utilisation factor for gains	ng pe for li	eriods in	the livea, h1,n	ing n (s	ee Tab	ole 9a)		ug Sep	Oc 0.95	<u> </u>	Dec		21	(85)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99	ng pe for li lar	eriods in ving are Apr 0.93	n the liv ea, h1,n May	ing n (s	ee Tab Jun 0.64	Jul 0.48	A 0.5	ug Sep 53 0.78				;	21	
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature	ng pe for li lar 98	eriods in ving are Apr 0.93	n the livea, h1,n May 0.82	ing n (s	ee Tak Jun 0.64	ole 9a) Jul 0.48 os 3 to 7	0.5 7 in T	ug Sep 33 0.78 able 9c)	0.95	0.99	1		21	(86)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.9 Mean internal temperature (87)m= 19.7 19.89 20	ng pe for li lar 98 e in li	eriods in ving are Apr 0.93 iving are 20.54	n the livea, h1,n May 0.82 ea T1 (f	ing n (s follo	ee Tab Jun 0.64 ow step 20.96	ole 9a) Jul 0.48 os 3 to 7 20.99	0.5 7 in T 20.	ug Sep i3 0.78 Table 9c) 99 20.89		0.99			21	
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati	for ling per	eriods in ving are Apr 0.93 iving are 20.54	n the lives, h1,n May 0.82 ea T1 (f 20.82	ing n (s follo	Jun 0.64 ow step 20.96 velling	Jul 0.48 os 3 to 7 20.99 from Ta	A 0.57 in T 20.	ug Sep 33 0.78 able 9c) 99 20.89 9, Th2 (°C)	0.95	0.99	19.67		21	(86)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.9 Mean internal temperature (87)m= 19.7 19.89 20	for ling per	eriods in ving are Apr 0.93 iving are 20.54	n the livea, h1,n May 0.82 ea T1 (f	ing n (s follo	ee Tab Jun 0.64 ow step 20.96	ole 9a) Jul 0.48 os 3 to 7 20.99	0.5 7 in T 20.	ug Sep 33 0.78 Table 9c) 99 20.89 9, Th2 (°C)	0.95	0.99	1		21	(86)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati	for li for li far e in li 18 ng pe	eriods in ving are Apr 0.93 iving are 20.54 eriods in	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of	n (s	ee Tab Jun 0.64 www.step 20.96 velling 19.89	Jul 0.48 0s 3 to 7 20.99 from Ta	A 0.57 in T 20.	ug Sep 33 0.78 able 9c) 99 20.89 9, Th2 (°C)	0.95	0.99	19.67		21	(86)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati (88)m= 19.86 19.86 19	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of	ing (s)	ee Tab Jun 0.64 www.step 20.96 velling 19.89	Jul 0.48 0s 3 to 7 20.99 from Ta	A 0.57 in T 20.	ug Sep 3 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89	0.95	0.99 2 20.04 3 19.88	19.67		21	(86)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.9 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati (88)m= 19.86 19.86 19 Utilisation factor for gains (89)m= 0.99 0.99 0.99	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76	ing m (s	ee Tab Jun 0.64 ow step 20.96 velling 9.89 m (see	ole 9a) Jul 0.48 os 3 to 7 20.99 from Ta 19.89 e Table 0.36	A 0.57 in T 20.42 able 9 19.42 9a)	ug Sep 3 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89	0.95 20.52 19.88	0.99 2 20.04 3 19.88	19.67		21	(86) (87) (88)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.9 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati (88)m= 19.86 19.86 19 Utilisation factor for gains	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76	ing n (s following followi	ee Tab Jun 0.64 ow step 20.96 velling 9.89 m (see	ole 9a) Jul 0.48 os 3 to 7 20.99 from Ta 19.89 e Table 0.36	A 0.57 in T 20.42 able 9 19.42 9a)	ug Sep 63 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 10 0.7 to 7 in Table	0.95 20.52 19.88	0.99 2 20.04 3 19.88 0.99	19.67		21	(86) (87) (88)
Temperature during heating to till sation factor for gains and the sation factor for gains and the sation factor for gains are sationally sationally sational factor for gains and the sational factor for gains are sationally sational factor for gains and sational factor for gains are sational factor for gains and sational factor for gains are sational factor for gains are sational factor for gains and sational factor for gains are sational factor factor for gains are sational factor factor for gains are sational factor	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of	ea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76	ing n (s following followi	ee Tab Jun 0.64 www step 20.96 velling 19.89 mm (see 0.55 T2 (fo	Jul 0.48 0.36 0.36 0.36	A 0.5.7 in T 20. 20. 19. 19. 9a) 0.4	ug Sep 53 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 10 0.7 to 7 in Table 89 19.81	0.95 20.5; 19.8i 0.93 e 9c) 19.33	0.99 2 20.04 3 19.88 0.99	1 19.67 19.87 1			(86) (87) (88) (89)
Temperature during heating the state of the	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71	ing (s)	ee Tab Jun 0.64 www step 20.96 velling 19.89 mm (see 0.55 T2 (fo	Jul 0.48 0.48 0.36 0.36 0.36 0.36	A 0.5 of 19.	ug Sep 33 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 11 0.7 to 7 in Tabl 89 19.81	0.95 20.5; 19.8i 0.93 e 9c) 19.33	0.99 2 20.04 3 19.88 0.99	1 19.67 19.87 1		0.36	(86) (87) (88) (89)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati (88)m= 19.86 19.86 19 Utilisation factor for gains (89)m= 0.99 0.99 0.99 Mean internal temperature (90)m= 18.15 18.43 18	for ling per	Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of 19.36	ea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71	ing (s) folloo	ee Tak Jun 0.64 w step 20.96 velling 9.89 m (see 0.55 T2 (fo 9.86 g) = fL	Jul 0.48 0.5 3 to 7 20.99 from Ta 19.89 e Table 0.36 ollow ste 19.89	A 0.5 7 in T 20. able 9 9a) 0.4 eps 3 19.	ug Sep 3 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 10.7 to 7 in Table 89 19.81	0.95 20.5: 19.8i 0.93 le 9c) 19.3: fLA = Li	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (-	19.67 19.87 1 18.11 4) =			(86) (87) (88) (89) (90) (91)
Temperature during heating to the state of t	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of du 0.9 he rest of 19.36 the who 19.78	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71	ing (s) follow f	ee Tab Jun 0.64 ow step 0.96 velling 9.89 T2 (fo 19.86 g) = fL 20.26	Jul 0.48 0s 3 to 7 20.99 from Ta 19.89 e Table 0.36 flow ste 19.89 A × T1 20.28	A A 0.57 in T 20.	ug Sep 53 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 10 7 in Tabl 89 19.81	0.95 20.52 19.86 0.93 le 9c) 19.33 fLA = Li	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (1 19.67 19.87 1			(86) (87) (88) (89)
Temperature during heating to the state of t	for line line line line line line line line	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of 19.36 the whole 19.78 internal	ea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71 ole dwe 20.11 tempe	ing n (s follo 2 f dw h2 lling 1 ratu	ee Tak Jun 0.64 w step 20.96 velling 9.89 m (see 0.55 T2 (fo 9.86 g) = fL 20.26 ure fror	Jul 0.48 0s 3 to 7 20.99 from Ta 19.89 e Table 0.36 flow ste 19.89 A × T1 20.28 m Table	A 0.5 7 in T 20. able 9 9a) 0.4 eps 3 19. + (1 20. able 4 4e,	ug Sep 3 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 1 0.7 to 7 in Table 89 19.81 — fLA) × T2 28 20.19 where approximation in the second content in	0.95 20.52 19.86 0.93 le 9c) 19.33 fLA = Li	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (19.67 19.87 1 18.11 4) =			(86) (87) (88) (89) (90) (91) (92)
Temperature during heating the state of the	for line line line line line line line line	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of du 0.9 he rest of 19.36 the who 19.78	n the livea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71	ing n (s follo 2 f dw h2 lling 1 ratu	ee Tab Jun 0.64 ow step 0.96 velling 9.89 T2 (fo 19.86 g) = fL 20.26	Jul 0.48 0s 3 to 7 20.99 from Ta 19.89 e Table 0.36 flow ste 19.89 A × T1 20.28	A A 0.57 in T 20.	ug Sep 3 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 1 0.7 to 7 in Table 89 19.81 — fLA) × T2 28 20.19 where approximation in the second content in	0.95 20.52 19.86 0.93 le 9c) 19.33 fLA = Li	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (19.67 19.87 1 18.11 4) =			(86) (87) (88) (89) (90) (91)
Temperature during heating to the state of t	for ling per	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of 19.36 the whole 19.78 internal	ea, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71 ole dwe 20.11 tempe	ing n (s follo 2 f dw h2 lling 1 ratu	ee Tak Jun 0.64 w step 20.96 velling 9.89 m (see 0.55 T2 (fo 9.86 g) = fL 20.26 ure fror	Jul 0.48 0s 3 to 7 20.99 from Ta 19.89 e Table 0.36 flow ste 19.89 A × T1 20.28 m Table	A 0.5 7 in T 20. able 9 9a) 0.4 eps 3 19. + (1 20. able 4 4e,	ug Sep 3 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 1 0.7 to 7 in Table 89 19.81 — fLA) × T2 28 20.19 where approximation in the second content in	0.95 20.5: 19.8i 0.93 le 9c) 19.3: fLA = Li 19.7' opriate	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (19.67 19.87 1 18.11 4) =			(86) (87) (88) (89) (90) (91) (92)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati (88)m= 19.86 19.86 19 Utilisation factor for gains (89)m= 0.99 0.99 0.99 Mean internal temperature (90)m= 18.15 18.43 18 Mean internal temperature (92)m= 18.7 18.95 19 Apply adjustment to the m (93)m= 18.7 18.95 19 8. Space heating requirements	for line and	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of 19.36 rest of 19.78 internal 19.78 internal 19.78	the lives, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71 ole dwe 20.11 tempe 20.11	ing m (s follo follo follo follo gratue gratue gratue gratue	ee Tak Jun 0.64 w step 20.96 velling 9.89 ,m (see 0.55 T2 (fo 9.86 g) = fL 20.26 ure from 20.26	Jul 0.48 0s 3 to 7 20.99 from Ta 19.89 e Table 0.36 flow ste 19.89 A × T1 20.28 m Table 20.28	9a) 0.4 0.5 4eps 3 19.	ug Sep 33 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 10.7 10	0.95 19.86 0.93 19.36 19.77 ppriate 19.77	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (19.67 19.87 1 18.11 4) =		0.36	(86) (87) (88) (89) (90) (91) (92)
Temperature during heati Utilisation factor for gains Jan Feb M (86)m= 1 0.99 0.99 Mean internal temperature (87)m= 19.7 19.89 20 Temperature during heati (88)m= 19.86 19.86 19 Utilisation factor for gains (89)m= 0.99 0.99 0.99 Mean internal temperature (90)m= 18.15 18.43 18 Mean internal temperature (92)m= 18.7 18.95 19 Apply adjustment to the m (93)m= 18.7 18.95 19	for line and	eriods in ving are Apr 0.93 iving are 20.54 eriods in 19.88 est of dv 0.9 he rest of 19.36 rest of 19.78 internal 19.78 internal 19.78	the lives, h1,n May 0.82 ea T1 (f 20.82 n rest of 19.88 welling, 0.76 of dwel 19.71 ole dwe 20.11 tempe 20.11	ing m (s follo follo follo follo gratue gratue gratue gratue	ee Tak Jun 0.64 w step 20.96 velling 9.89 ,m (see 0.55 T2 (fo 9.86 g) = fL 20.26 ure from 20.26	Jul 0.48 0s 3 to 7 20.99 from Ta 19.89 e Table 0.36 flow ste 19.89 A × T1 20.28 m Table 20.28	9a) 0.4 0.5 4eps 3 19.	ug Sep 33 0.78 Table 9c) 99 20.89 9, Th2 (°C) 89 19.89 10.7 10	0.95 19.86 0.93 19.36 19.77 ppriate 19.77	0.99 2 20.04 3 19.88 0.99 5 18.66 ving area ÷ (19.67 19.87 1 18.11 4) =		0.36	(86) (87) (88) (89) (90) (91) (92)

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Utilisation factor f	r gains. hr	m:										
(94)m= 0.99 0.	<u> </u>	0.9	0.77	0.58	0.41	0.46	0.72	0.93	0.98	0.99		(94)
Useful gains, hm	m , W = (9	94)m x (8	4)m	ı	l		!	l				
(95)m= 545.55 64°	74 719.65	760.99	703.6	518.85	348.01	364	526.91	587.96	540.52	514.84		(95)
Monthly average	xternal ter	mperature	e from Ta	able 8								
(96)m= 4.3 4	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			1		-``	- ` 	<u> </u>					
(97)m= 1413.76 137			809.8	539.11	351.01	369.15	583.28	882.98	1166.3	1406.03		(97)
Space heating re		1	T T	r		- ``	i `	í - `	 			
(98)m= 645.95 493	31 396.53	208.34	79.02	0	0	0	0	219.49	450.56	663.04		7,000
						Tota	al per year	(kWh/yea	r) = Sum(9	8) _{15,912} =	3156.25	(98)
Space heating re	uirement i	n kWh/m ²	²/year								40.93	(99)
9a. Energy require	nents – Ind	dividual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space heating:												,
Fraction of space	neat from	secondar	y/supple	mentary	system						0	(201)
Fraction of space	neat from i	main syst	tem(s)			(202) = 1	- (201) =				1	(202)
Fraction of total h	ating from	main sy	stem 1			(204) = (2	(02) x [1 –	(203)] =			1	(204)
Efficiency of mair	space hea	iting syste	em 1							Ī	93.5	(206)
Efficiency of seco	ndary/supp	lementar	y heating	g systen	າ, %						0	(208)
Jan F	b Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Space heating requirement (calculated above)										·		
645.95 493	31 396.53	208.34	79.02	0	0	0	0	219.49	450.56	663.04		
(211)m = {[(98)m >	(204)] } x	100 ÷ (20	06)	-	-	-	-	-	-			(211)
690.86 52	6 424.1	222.83	84.51	0	0	0	0	234.75	481.89	709.13		
						Tota	al (kWh/yea	ar) =Sum(2	211),15,1012	=	3375.67	(211)
Space heating fu	l (seconda	ry), kWh	month/							•		_
$= \{[(98)m \times (201)]\}$	x 100 ÷ (2	08)							1			
(215)m= 0	0	0	0	0	0	0	0	0	0	0		7
						Tota	al (kWh/yea	ar) =Sum(2	215) _{15,1012}	=	0	(215)
Water heating												
Output from water			159.08	142.16	136.54	149.81	149.54	168.32	177.97	190.89		
Efficiency of water		102.00	100.00	1 12:10	100.01	1 10.01	1 10.01	100.02	1 111.01	100.00	79.8	(216)
(217)m= 87.76 87		85.48	83.06	79.8	79.8	79.8	79.8	85.52	87.19	87.87	70.0	(217)
Fuel for water hea			00.00	10.0	1 0.0	1 70.0	7 0.0	00.02		07.01		,
$(219)m = (64)m \times$												
(219)m= 222.86 197	11 208.48	189.9	191.53	178.15	171.11	187.73	187.4	196.81	204.11	217.25		
						Tota	al = Sum(2	19a) ₁₁₂ =			2352.43	(219)
Annual totals								k	Wh/year	,	kWh/year	7
											0075.07	1
Space heating fue	used, mair	n system	1								3375.67	_
Space heating fue Water heating fuel		n system	1							[2352.43]

central heating pump:			30		(230c)
boiler with a fan-assisted flue			45		(230e)
Total electricity for the above, kWh/year	sum of (23	30a)(230g) =		75	(231)
Electricity for lighting				336.08	(232)
Total delivered energy for all uses (211)(221) +	(231) + (232)(237b) =			6139.18	(338)
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	Energy kWh/year	Emission fac kg CO2/kWh		Emissions kg CO2/yea	r
Space heating (main system 1)	(211) x	0.216	=	729.14	(261)
Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	508.13	(264)
Space and water heating	(261) + (262) + (263) + (264) =	=		1237.27	(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	SU	um of (265)(271) =		1450.62	(272)
					-

TER =

(273)

27.64