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 14:55:38*

Project Information:

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

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 76.59m²

Site Reference: Fosters Estate Block D

Plot Reference: D2-05

Address:

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity (c)

Fuel factor: 1.55 (electricity (c))

Target Carbon Dioxide Emission Rate (TER) 27.17 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

11.94 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 54.1 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 50.6 kWh/m²

ОК

2 Fabric U-values

ElementAverageHighestExternal wall0.15 (max. 0.30)0.20 (max. 0.70)

Floor (no floor)

Roof (no roof)

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	
Community heating, heat from electric heat pump		

Predicted Energy Assessment

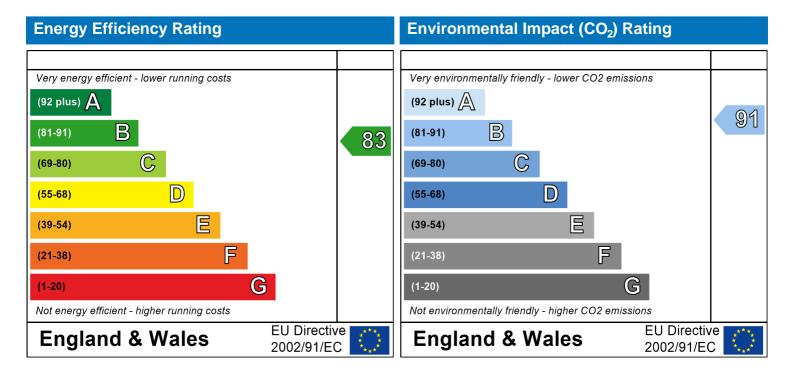


Dwelling type:
Date of assessment:
Produced by:
Total floor area:

Mid floor Flat 13 October 2022 Ben Talbutt 76.59 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: D2-05

Address:

Located in: England Region: Thames valley

UPRN:

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

Assessment type: New dwelling design stage

Transaction type:

Tenure type:

Related party disclosure:

Thermal Mass Parameter:

New dwelling

Unknown

No related party

Indicative Value Medium

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

PCDF Version: 505

Property description:

Dwelling type: Flat

Detachment:

Year Completed: 2022

Floor Location: Floor area:

Storey height: 76.59 m^2 2.82 m

Living area: 27.97 m² (fraction 0.365)

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 Fact	tor: g-value:	U-value:	Area:	No. of Openings:
Front Door	mm	1	0	0.91	2.52	1
Win 1	16mm or more	8.0	0.4	1.4	2.9	1
Win 2	16mm or more	8.0	0.4	1.4	5.42	1
Win 3	16mm or more	8.0	0.4	1.4	1.99	1
Win 4	16mm or more	8.0	0.4	1.4	1.99	1
Win 5	16mm or more	0.8	0.4	1.4	0.9	1
Win 6	16mm or more	0.8	0.4	1.4	0.91	2
Win 7	16mm or more	0.8	0.4	1.4	2.01	2
Win 8	16mm or more	0.8	0.4	1.4	0.62	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
Front Door	-	Ext Wall	South East	1.05	2.4
Win 1		Ext Wall	North East	1.47	1.97
Win 2		Ext Wall	North East	2.26	2.4
Win 3		Ext Wall	South East	1.02	1.95
Win 4		Ext Wall	North West	1.02	1.95
Win 5		Ext Wall	North West	0.46	1.95
Win 6		Ext Wall	South West	0.46	1.97
Win 7		Ext Wall	South West	1.02	1.97

SAP Input

Win 8 Ext Wall South West 0.46 1.35

Overshading: Average or unknown

Opaque	Elements:		

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Карра:
External Element	<u>S</u>						
Ext Wall	76.47	22.18	54.29	0.14	0	False	N/A
Concrete Column	7.05	0	7.05	0.2	0	False	N/A
Common Area	21.31	0	21.31	0.2	0.9	False	N/A
Internal Element	<u>s</u>						
Party Elements	_						

Thermal bridges

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.1476

	Length	Psi-value	,	
[Approved]	10.7	0.3	E2	Other lintels (including other steel lintels)
[Approved]	9.65	0.04	E3	Sill
[Approved]	43.7	0.05	E4	Jamb
[Approved]	30.14	0.07	E7	Party floor between dwellings (in blocks of flats)
[Approved]	14.1	0.09	E16	Corner (normal)
	7.14	0.08	E14	Flat roof
[Approved]	2.82	-0.09	E17	Corner (inverted internal area greater than external area)
	37.18	0.14	E7	Party floor between dwellings (in blocks of flats)
[Approved]	0	0.16	E5	Ground floor (normal)
[Approved]	0	0.07	E6	Intermediate floor within a dwelling
	0	0.32	E20	Exposed floor (normal)
[Approved]	0	0.06	E18	Party wall between dwellings
	6.62	0.12	E24	Eaves (insulation at ceiling level - inverted)
	0	0.24	P8	Exposed floor (inverted)
	0	0.24	P4	Roof (insulation at ceiling level)

Ventilation:

Pressure test: Yes (As designed)

Ventilation: Balanced with heat recovery

Number of wet rooms: Kitchen + 1

Ductwork: Insulation, Rigid

Approved Installation Scheme: True

Number of chimneys: 0
Number of open flues: 0
Number of fans: 0
Number of passive stacks: 0
Number of sides sheltered: 2
Pressure test: 3

Main heating system:

Main heating system: Community heating schemes

Heat source: Community heat pump

heat from electric heat pump, heat fraction 1, efficiency 383

Piping>=1991, pre-insulated, low temp, variable flow

Main heating Control:

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

thermostats

Control code: 2312

Secondary heating system:

Secondary heating system: None

SAP Input

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

		User Deta	aile:				
Access Nove	Don Talk ::#			ala c ==	OTDO	000000	
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012		troma Nun oftware Ve			036639 on: 1.0.5.17	
Software Hame.			dress: D2-05		VCISIC	71. 1.0.0.17	
Address :							
1. Overall dwelling dime	ensions:						
Ground floor		Area(m	<u> </u>		ight(m)	Volume(m ³	<u>-</u>
) (41) (4) (4) (4)	76.59		2	.82 (2a) =	215.98	(3a)
	a)+(1b)+(1c)+(1d)+(1e)+(1	n) 76.59	. ,				
Dwelling volume			(3a)+(3	b)+(3c)+(3c	d)+(3e)+(3n) =	215.98	(5)
2. Ventilation rate:	main casanda	m. 04l	her	total		m³ nor hou	
	main seconda heating heating		ner .	total		m³ per hou	_
Number of chimneys	0 + 0	+	0 =	0	x 40 =	0	(6a)
Number of open flues	0 + 0	+	0 =	0	x 20 =	0	(6b)
Number of intermittent fa	ns		[0	x 10 =	0	(7a)
Number of passive vents	1			0	x 10 =	0	(7b)
Number of flueless gas fi	res		j	0	x 40 =	0	(7c)
			ı				
			_		Air ch	nanges per ho	our
	ys, flues and fans = $(6a)+(6b)+(6b)$			0	÷ (5) =	0	(8)
Number of storeys in t	een carried out or is intended, procee he dwelling (ns)	ed to (17), othe	erwise continue	from (9) to ((16)	0	(9)
Additional infiltration	ne aweiling (115)				[(9)-1]x0.1 =	0	(10)
Structural infiltration: 0	.25 for steel or timber frame o	r 0.35 for m	nasonry cons	truction	. , ,	0	(11)
	resent, use the value corresponding to	o the greater w	wall area (after				
deducting areas of openii	ngs);	.1 (sealed).	. else enter 0			0	(12)
If no draught lobby, en	,	(oca.ca),	, 0.00 011.01 0			0	(13)
• ,	s and doors draught stripped					0	(14)
Window infiltration		0.2	25 - [0.2 x (14) ÷	100] =		0	(15)
Infiltration rate		(8)	+ (10) + (11) +	(12) + (13)	+ (15) =	0	(16)
•	q50, expressed in cubic metre	•		netre of e	envelope area	3	(17)
	ity value, then $(18) = [(17) \div 20] + (18) = [(17) \div 20]$					0.15	(18)
Number of sides sheltere	es if a pressurisation test has been do. ad	ne or a degree	e air permeabilit	y is being u	sed		(19)
Shelter factor	eu .	(20	0) = 1 - [0.075 x	(19)] =		0.85	(20)
Infiltration rate incorporat	ting shelter factor	(21	1) = (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	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		
	1 133 3.00					I	

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 effective air change rate for the applicable case If mechanical ventilation: 0.16 0.16 0.16 0.14 0.14 0.12 0.12 0.12 0.13 0.14 0.14 0.15 0.5	
Managhar Carl Cardiagas	
If mechanical ventilation: 0.5	— ,
If exhaust air heat pump using Appendix N, (23b) = (23a) × Fmv (equation (N5)), otherwise (23b) = (23a)	(23:
If helphood with heat recovery efficiency in 0/ allowing for in use factor (from Table 4b)	(23)
74.0	(23
a) If balanced mechanical ventilation with heat recovery (MVHR) $(24a)m = (22b)m + (23b) \times [1 - (23c) \div 100]$	(24
	(24)
b) If balanced mechanical ventilation without heat recovery (MV) (24b)m = (22b)m + (23b) (24b)m = 0 0 0 0 0 0 0 0 0 0	(24
	(24)
c) If whole house extract ventilation or positive input ventilation from outside if $(22b)m < 0.5 \times (23b)$, then $(24c) = (23b)$; otherwise $(24c) = (22b)m + 0.5 \times (23b)$	
(24c)m =	(24
d) If natural ventilation or whole house positive input ventilation from loft	•
if $(22b)m = 1$, then $(24d)m = (22b)m$ otherwise $(24d)m = 0.5 + [(22b)m^2 \times 0.5]$	
(24d)m= 0 0 0 0 0 0 0 0 0 0 0 0	(24
Effective air change rate - enter (24a) or (24b) or (24c) or (24d) in box (25)	
(25)m= 0.29 0.29 0.28 0.27 0.26 0.25 0.24 0.25 0.26 0.27 0.28	(25)
3. Heat losses and heat loss parameter:	
ELEMENT Gross Openings Net Area U-value A X U k-value A	Χk
	J/K
	(26)
Windows Type 1 $2.9 \times 1/[1/(1.4) + 0.04] = 3.84$	(27)
Windows Type 2 5.42 $x1/[1/(1.4) + 0.04] = 7.19$	(27)
Windows Type 3 1.99 $x^{1/[1/(1.4) + 0.04]} = 2.64$	(27)
Windows Type 4 1.99 $x^{1/[1/(1.4) + 0.04]} = 2.64$	(27)
Windows Type 5 0.9 $x^{1/[1/(1.4) + 0.04]} = 1.19$	(27)
Windows Type 6 0.91 $x^{1/[1/(1.4) + 0.04]} = 1.21$	(27)
Windows Type 7 $2.01 x^{1/[1/(1.4) + 0.04]} = 2.66$	(27)
Windows Type 8 $0.62 x^{1/[1/(1.4) + 0.04]} = 0.82$	(27)
Walls Type1 76.47 22.18 54.29 x 0.14 = 7.6	(29)
	(29)
Walls Type2 7.05 0 7.05 x 0.2 = 1.41	=
Walls Type2 7.05 0 7.05 x 0.2 = 1.41 Walls Type3 21.31 0 21.31 x 0.17 = 3.61	(29)
	(29)
Walls Type3 21.31 0 21.31 × 0.17 = 3.61 Total area of elements, m ² 104.83 * for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2	
Walls Type3 21.31 0 21.31 x 0.17 = 3.61 Total area of elements, m ² * for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions	(31)
Walls Type3 21.31 0 21.31 x 0.17 = 3.61 Total area of elements, m ² * for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions Fabric heat loss, W/K = S (A x U) (26)(30) + (32) = 40.98	(31)
Walls Type3 21.31 0 21.31 \times 0.17 = 3.61 Total area of elements, m ² 104.83 * for windows and roof windows, use effective window U-value calculated using formula $1/[(1/U-value)+0.04]$ as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions Fabric heat loss, W/K = S (A x U) (26)(30) + (32) = 40.98 Heat capacity Cm = S(A x k) ((28)(30) + (32) + (32a)(32e) = 0	(31)
Walls Type3 21.31 0 21.31 \times 0.17 = 3.61 Total area of elements, m ² 104.83 * for windows and roof windows, use effective window U-value calculated using formula $1/[(1/U-value)+0.04]$ as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions Fabric heat loss, W/K = S (A x U) (26)(30) + (32) = 40.98 Heat capacity Cm = S(A x k) ((28)(30) + (32) + (32a)(32e) = 0 Thermal mass parameter (TMP = Cm \div TFA) in kJ/m ² K Indicative Value: Medium 250	(31)
Walls Type3 21.31 0 21.31 \times 0.17 = 3.61 Total area of elements, m ² 104.83 * for windows and roof windows, use effective window U-value calculated using formula $1/[(1/U-value)+0.04]$ as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions Fabric heat loss, W/K = S (A x U) (26)(30) + (32) = 40.98 Heat capacity Cm = S(A x k) ((28)(30) + (32) + (32a)(32e) = 0	(31)

otal fabric he								(33) +	` '	> (->		56.46	(37
entilation hea						Ι	I .	` '	`	25)m x (5)	_		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(0.
38)m= 20.57	20.34	20.11	18.98	18.75	17.61	17.61	17.39	18.07	18.75	19.2	19.66		(38
leat transfer	coefficier	nt, W/K						(39)m	= (37) + (3	38)m			
39)m= 77.02	76.8	76.57	75.43	75.21	74.07	74.07	73.84	74.52	75.21	75.66	76.12		
		\							_	Sum(39) ₁ .	12 /12=	75.38	(3
leat loss para	- `					T			= (39)m ÷	<u>` </u>			
1.01	1	1	0.98	0.98	0.97	0.97	0.96	0.97	0.98	0.99	0.99		— ,,
lumber of day	vs in mor	nth (Tabl	le 1a)					,	Average =	Sum(40) ₁ .	12 /12=	0.98	(4
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
11)m= 31	28	31	30	31	30	31	31	30	31	30	31		(4
.,													•
1 \\\\ a = \ b = a	ting one		wa 100 a 10 ft								LeVA/les/see	. O.W.	
4. Water hea	ung ener	gy requi	rement.								kWh/ye	ar.	
ssumed occi											39		(4
if TFA > 13.		+ 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.	9)			
if TFA £ 13. nnual averag	,	ator usac	ne in litre	s ner da	w Vd av	erage –	(25 v NI)	+ 36		0.4	00		()
educe the annu									se target o		.08		(4
t more that 125	litres per p	oerson per	day (all w	ater use, h	not and co	ld)							
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
	Feb			,			•	Sep	Oct	Nov	Dec		
ot water usage	Feb			,			•	Sep 89.26	Oct 92.9	Nov 96.55	Dec 100.19		
ot water usage if	Feb in litres per 96.55	day for ea	89.26	Vd,m = fac 85.62	ctor from 7 81.97	Table 1c x 81.97	(43) 85.62	89.26	92.9 Fotal = Su	96.55 m(44) ₁₁₂ =	100.19	1092.97	((
ot water usage	Feb in litres per 96.55	day for ea	89.26	Vd,m = fac 85.62	ctor from 7 81.97	Table 1c x 81.97	(43) 85.62	89.26	92.9 Fotal = Su	96.55 m(44) ₁₁₂ =	100.19	1092.97	(4
ot water usage if	Feb in litres per 96.55	day for ea	89.26	Vd,m = fac 85.62	ctor from 7 81.97	Table 1c x 81.97	(43) 85.62	89.26	92.9 Fotal = Su	96.55 m(44) ₁₁₂ =	100.19	1092.97	(4
ot water usage in the state of	Feb in litres per 96.55 fhot water 129.95	92.9 used - calc 134.09	89.26 culated mo	Vd,m = factor 85.62 $Soft by the equation of the equation o$	81.97 190 x Vd,r 96.8	81.97 m x nm x E 89.7	(43) 85.62 0Tm / 3600 102.93	89.26) kWh/mor 104.16	92.9 Fotal = Su th (see Ta	96.55 m(44) ₁₁₂ = ables 1b, 1	100.19 = c, 1d) 143.89	1092.97 1433.05	
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ot water usage in the standard of the standard	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49	92.9 used - calc 134.09	89.26 culated mo	Vd,m = factor 85.62 $Soft by the equation of the equation o$	81.97 190 x Vd,r 96.8	81.97 m x nm x E 89.7	(43) 85.62 0Tm / 3600 102.93	89.26) kWh/mor 104.16	92.9 Fotal = Su th (see Ta	96.55 m(44) ₁₁₂ = ables 1b, 1	100.19 = c, 1d) 143.89		((
ot water usage in the standard	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49	92.9 used - cale 134.09 ng at point 20.11	89.26 culated mo 116.91 of use (no	Vd,m = factors 85.62 $0nthly = 4.$ 112.17 $0 hot water$ 16.83	81.97 81.97 190 x Vd,r 96.8 storage),	81.97 m x nm x E 89.7 enter 0 in 13.45	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44	89.26 0 kWh/mor 104.16 0 to (61) 15.62	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ =	100.19 = c, 1d) 143.89 = 21.58		(<i>(</i>
ot water usage in the standard process of the standard	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49 closs: ne (litres)	92.9 used - calc 134.09 ng at point 20.11	89.26 culated mo 116.91 of use (no	Vd,m = factor 85.62 $Sold Matter 112.17$ $Sold Matter 16.83$ $Sold Matter 16.83$	81.97 190 x Vd,r 96.8 storage), 14.52	81.97 m x nm x E 89.7 enter 0 in 13.45	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa	89.26 0 kWh/mor 104.16 0 to (61) 15.62	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ =	100.19 = c, 1d) 143.89		(<i>(</i>
ot water usage in the standard	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49 Floss: ne (litres) neating a	92.9 used - cale 134.09 ng at point 20.11 includin	ach month 89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw	Vd,m = factors 85.62 $to the factors$ $to the factor$	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110	81.97 m x nm x E 89.7 enter 0 in 13.45 storage litres in	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47)	89.26 0 kWh/mor 104.16 0 to (61) 15.62 ame vess	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ =	100.19 = c, 1d) 143.89 = 21.58		(,
twater usage in the standard s	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49 Floss: ne (litres) neating a o stored	92.9 used - cale 134.09 ng at point 20.11 includin	ach month 89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw	Vd,m = factors 85.62 $to the factors$ $to the factor$	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110	81.97 m x nm x E 89.7 enter 0 in 13.45 storage litres in	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47)	89.26 0 kWh/mor 104.16 0 to (61) 15.62 ame vess	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ =	100.19 = c, 1d) 143.89 = 21.58		(,
ot water usage in the standard	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49 e loss: ne (litres) neating a stored e loss:	92.9 used - calc 134.09 ng at point 20.11 includin nd no ta hot wate	89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw er (this in	Vd,m = fac 85.62 onthly = 4. 112.17 o hot water 16.83 olar or W velling, e	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous co	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47)	89.26 0 kWh/mor 104.16 0 to (61) 15.62 ame vess	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ = 19.88	100.19 = c, 1d) 143.89 = 21.58		(4)
twater usage in the startaneous with the storage in	Feb in litres per 96.55 f hot water 129.95 vater heatin 19.49 closs: ne (litres) neating a o stored closs: turer's de	92.9 used - calc 134.09 ag at point 20.11 includin nd no ta hot wate	ach month 89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw er (this in	Vd,m = fac 85.62 onthly = 4. 112.17 o hot water 16.83 olar or W velling, e	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous co	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47)	89.26 0 kWh/mor 104.16 0 to (61) 15.62 ame vess	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ = 19.88	100.19 = c, 1d) 143.89 = 21.58		(
ot water usage in the standard	Feb in litres per 96.55 f hot water 129.95 water heatin 19.49 c loss: ne (litres) neating a o stored c loss: turer's defactor fro	used - cale 134.09 ag at point 20.11 includin nd no ta hot wate	ach month 89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw er (this in oss facto 2b	Vd,m = factors 85.62 $to the factors$ $to the factor$	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous con/day):	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47)	89.26 0 kWh/mor 104.16 15.62 ame vessers) enter	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ =	100.19 = c, 1d) 143.89 = 21.58		(4)
ot water usage in the standard of the standard	Feb in litres per 96.55 f hot water 129.95 vater heatin 19.49 loss: ne (litres) neating a o stored e loss: turer's defactor froom water	92.9 used - calc 134.09 ng at point 20.11 includin nd no ta hot wate eclared le m Table storage	ach month 89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw er (this in oss facto 2b , kWh/ye	Vd,m = factors 85.62 $to nthly = 4$. $to hot water$ $to hot w$	81.97 190 x Vd,r 96.8 14.52 /WHRS nter 110 nstantar	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous con/day):	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47) mbi boil	89.26 0 kWh/mor 104.16 15.62 ame vessers) enter	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ =	100.19 = c, 1d) 143.89 = 21.58		(.4. (.4. (.4. (.4. (.4. (.4. (.4. (.4.
twater usage in the regy content of the standard of the standa	Feb in litres per 96.55 f hot water 129.95 vater heatin 19.49 Floss: ne (litres) neating a constored eloss: turer's defactor from water turer's defage loss	used - calconders and no tachet water and rable storage eclared of factor fr	ach month 89.26 culated mo 116.91 of use (no 17.54 ag any so nk in dw er (this in oss facto 2b , kWh/ye cylinder I om Tabl	Vd,m = factors 85.62 $0 onthly = 4.$ 112.17 $0 hot water$ 16.83 $0 lar or Water$ $0 relling, each or is known and the constant of the$	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110 nstantar wn (kWh	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous con/day):	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47) mbi boil	89.26 0 kWh/mor 104.16 15.62 ame vessers) enter	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ = 19.88	100.19 = c, 1d) 143.89 = 21.58		(.4 (.4 (.4 (.4 (.4)
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twater usage in twater usage in twater usage in twater usage in the regy content of the regy content of twater storage to rage volume community in the rwise if nearly lost from the regy lost from twater storage of twater storage of twater storage in the regy lost from the regy lost from twater storage of twater stora	Feb in litres per 96.55 f hot water 129.95 vater heatin 19.49 c loss: ne (litres) neating a o stored c loss: turer's defactor fro om water turer's derage loss neating s from Tal	92.9 used - calc 134.09 ng at point 20.11 includin nd no tal hot water eclared le m Table storage eclared of factor fr ee section ble 2a	ach month 89.26 culated month of use (not) 17.54 ag any so nk in dwer (this in) oss facto 2b , kWh/ye cylinder I om Tabl on 4.3	Vd,m = factors 85.62 $0 onthly = 4.$ 112.17 $0 hot water$ 16.83 $0 lar or Water$ $0 relling, each or is known and the constant of the$	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110 nstantar wn (kWh	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous con/day):	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47) mbi boil	89.26 0 kWh/mor 104.16 15.62 ame vessers) enter	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21	96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ = 19.88 47)	100.19 = c, 1d) 143.89 = 21.58 0 0 0 0 00 00 00		(4) (4) (4) (4) (4) (4) (4) (4) (4) (4)
twater usage in the regy content of the storage volume community is the regy lost from th	Feb in litres per 96.55 f hot water 129.95 vater heatin 19.49 hoss: he (litres) heating a o stored closs: turer's de factor fro om water turer's de rage loss heating s from Tal factor fro	used - calce 134.09 ng at point 20.11 including the transfer of the storage eclared of factor free sections are made at the color free free sections are made at the color f	ach month 89.26 culated month 116.91 of use (note) 17.54 ag any son in dwer (this in oss factors) 2b kWh/ye cylinder I om Table on 4.3	Vd,m = factors State 85.62 onthly = 4. 112.17 16.83 olar or Water relling, eacludes in or is known or is known ear oss factors e 2 (kWl	81.97 190 x Vd,r 96.8 storage), 14.52 /WHRS nter 110 nstantar wn (kWh	81.97 81.97 89.7 enter 0 in 13.45 storage litres in neous con/day): known:	(43) 85.62 0Tm / 3600 102.93 boxes (46) 15.44 within sa (47) mbi boil	89.26 0 kWh/mor 104.16 15.62 ame ves: ers) ente	92.9 Fotal = Su th (see Ta 121.39 Fotal = Su 18.21 seel er '0' in (96.55 m(44) ₁₁₂ = ables 1b, 1 132.5 m(45) ₁₁₂ = 19.88 47)	100.19 = c, 1d) 143.89 = 21.58 0 0 10 02		(4)

Water storage	loss cal	culated f	for each	month			((56)m = (55) × (41)ı	m				
(56)m= 32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinder contain	s dedicate	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m= 32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Primary circuit	t loss (ar	nual) fro	m Table	3							0		(58)
Primary circuit	t loss cal	culated t	for each	month (59)m = ((58) ÷ 36	65 × (41)	m					
(modified by	/ factor f	rom Tab	le H5 if t	here is s	solar 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 ca	lculated	for each	month ((61)m =	(60) ÷ 36	65 × (41))m						
(61)m= 0	0	0	0	0	0	0	0	0	0	0	0		(61)
Total heat req	uired for	water he	eating ca	alculated	for eacl	h month	(62)m =	0.85 × (45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 203.85	179.87	189.37	170.4	167.45	150.29	144.97	158.21	157.65	176.66	186	199.17		(62)
Solar DHW input	calculated	using App	endix G or	Appendix	H (negati	ve quantity	/) (enter '0	' if no sola	r contribut	ion to wate	er heating)		
(add additiona	I lines if	FGHRS	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 w	ater hea	ter	-		-	-	-	-		-	-		
(64)m= 203.85	179.87	189.37	170.4	167.45	150.29	144.97	158.21	157.65	176.66	186	199.17		
							Outp	out from wa	ater heate	r (annual)₁	12	2083.89	(64)
Heat gains fro	m water	heating,	kWh/mo	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)m]	_
(65)m= 93.62	83.15	88.81	81.67	81.52	74.98	74.05	78.45	77.43	04.50	00.05	00.00		(65)
			01.07	01.02	1 77.50	14.03	70.45	11.43	84.58	86.85	92.06		(00)
include (57)	m in cal	<u> </u>			<u> </u>	<u> </u>	<u> </u>					eating	(00)
include (57)		culation o	of (65)m	only if c	<u> </u>	<u> </u>	<u> </u>					eating	(00)
5. Internal g	ains (see	culation of Table 5	of (65)m and 5a	only if c	<u> </u>	<u> </u>	<u> </u>					eating	(00)
5. Internal g	ains (see	culation of Table 5	of (65)m and 5a ts	only if c	ı :ylinder i:	s in the o	dwelling	or hot w	ater is fr	rom com	munity h	eating	(00)
5. Internal g	ains (see	culation of Table 5	of (65)m and 5a	only if c	<u> </u>	<u> </u>	<u> </u>					eating	(66)
5. Internal games Metabolic gair Jan	ns (Table Feb 143.7	E Table 5 5), Wat Mar	of (65)m 5 and 5a ts Apr 143.7	only if constant of the consta	Jun	Jul	Aug 143.7	or hot w	ater is fr	om com	munity h	eating	
5. Internal games Metabolic gair Jan (66)m= 143.7	ns (Table Feb 143.7	E Table 5 5), Wat Mar	of (65)m 5 and 5a ts Apr 143.7	only if constant of the consta	Jun	Jul	Aug 143.7	or hot w	ater is fr	om com	munity h	eating	
5. Internal games Metabolic gain Jan (66)m= 143.7 Lighting gains (67)m= 47.29	res (Table Feb 143.7 (calcula	ETable 5 E Table 5 E 5), Wat Mar 143.7 ted in Ap 34.16	of (65)m 6 and 5a ts Apr 143.7 opendix 25.86	May 143.7 L, equati	Jun 143.7 ion L9 o	Jul 143.7 r L9a), a	Aug 143.7 Iso see	Sep 143.7 Table 5 30.76	Oct 143.7	Nov	Dec	eating	(66)
5. Internal games Metabolic gain Jan (66)m= 143.7 Lighting gains	res (Table Feb 143.7 (calcula	ETable 5 E Table 5 E 5), Wat Mar 143.7 ted in Ap 34.16	of (65)m 6 and 5a ts Apr 143.7 opendix 25.86	May 143.7 L, equati	Jun 143.7 ion L9 o	Jul 143.7 r L9a), a	Aug 143.7 Iso see	Sep 143.7 Table 5 30.76	Oct 143.7	Nov	Dec	eating	(66)
5. Internal games Metabolic gair Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances games (68)m= 316.67	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95	Table 5 2 5), Wat Mar 143.7 ted in Ap 34.16 ulated in 311.67	of (65)m 5 and 5a ts Apr 143.7 opendix 25.86 Appendix 294.04	only if construction in the construction in th	Jun 143.7 ion L9 o 16.32 uation L 250.88	Jul 143.7 r L9a), a 17.63 13 or L1 236.9	Aug 143.7 Iso see 22.92 3a), also 233.62	Sep 143.7 Table 5 30.76 see Ta 241.9	Oct 143.7 39.06 ble 5 259.53	Nov 143.7 45.59	Dec 143.7	eating	(66) (67)
5. Internal games Metabolic gain Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances games	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95	Table 5 2 5), Wat Mar 143.7 ted in Ap 34.16 ulated in 311.67	of (65)m 5 and 5a ts Apr 143.7 opendix 25.86 Appendix 294.04	only if construction in the construction in th	Jun 143.7 ion L9 o 16.32 uation L 250.88	Jul 143.7 r L9a), a 17.63 13 or L1 236.9	Aug 143.7 Iso see 22.92 3a), also 233.62	Sep 143.7 Table 5 30.76 see Ta 241.9	Oct 143.7 39.06 ble 5 259.53	Nov 143.7 45.59	Dec 143.7	eating	(66) (67)
Metabolic gair Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances ga (68)m= 316.67 Cooking gains (69)m= 51.76	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 (calcula 51.76	ted in Apulated in	of (65)m s and 5a ts Apr 143.7 opendix 25.86 Append 294.04 opendix 51.76	May 143.7 L, equati 19.33 dix L, equati 271.79 L, equat	Jun 143.7 ion L9 of 16.32 uation L 250.88	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a)	Aug 143.7 Iso see 22.92 3a), also 233.62), also se	Sep 143.7 Table 5 30.76 See Tal 241.9 ee Table	Oct 143.7 39.06 ole 5 259.53 5	Nov 143.7 45.59	Dec 143.7 48.6 302.69	eating	(66) (67) (68)
5. Internal games Metabolic gain Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances games (68)m= 316.67 Cooking gains	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 (calcula 51.76	ted in Apulated in	of (65)m s and 5a ts Apr 143.7 opendix 25.86 Append 294.04 opendix 51.76	May 143.7 L, equati 19.33 dix L, equati 271.79 L, equat	Jun 143.7 ion L9 of 16.32 uation L 250.88	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a)	Aug 143.7 Iso see 22.92 3a), also 233.62), also se	Sep 143.7 Table 5 30.76 See Tal 241.9 ee Table	Oct 143.7 39.06 ole 5 259.53 5	Nov 143.7 45.59	Dec 143.7 48.6 302.69	eating	(66) (67) (68)
5. Internal given by the second of the secon	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 calcula 51.76 rs gains 0	ted in Apulated in	of (65)m ts Apr 143.7 ppendix 25.86 Appendix 294.04 ppendix 51.76 5a) 0	only if constructions: May 143.7 L, equati 19.33 dix L, equati 271.79 L, equati 51.76	Jun 143.7 ion L9 of 16.32 uation L 250.88 tion L15 51.76	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a) 51.76	Aug 143.7 Iso see 22.92 3a), also 233.62), also se 51.76	Sep 143.7 Table 5 30.76 see Ta 241.9 ee Table 51.76	Oct 143.7 39.06 ole 5 259.53 5 51.76	Nov 143.7 45.59 281.78	Dec 143.7 48.6 302.69 51.76	eating	(66) (67) (68) (69)
5. Internal given by the second of the secon	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 calcula 51.76 rs gains 0	ted in Apulated in	of (65)m ts Apr 143.7 ppendix 25.86 Appendix 294.04 ppendix 51.76 5a) 0	only if constructions: May 143.7 L, equati 19.33 dix L, equati 271.79 L, equati 51.76	Jun 143.7 ion L9 of 16.32 uation L 250.88 tion L15 51.76	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a) 51.76	Aug 143.7 Iso see 22.92 3a), also 233.62), also se 51.76	Sep 143.7 Table 5 30.76 see Ta 241.9 ee Table 51.76	Oct 143.7 39.06 ole 5 259.53 5 51.76	Nov 143.7 45.59 281.78	Dec 143.7 48.6 302.69 51.76	eating	(66) (67) (68) (69)
Metabolic gair Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances ga (68)m= 316.67 Cooking gains (69)m= 51.76 Pumps and fa (70)m= 0 Losses e.g. ev (71)m= -95.8	res (Table Feb 143.7 (calcula 42 ins (calcula 51.76 res gains 0 reporation -95.8	ted in Ap 31.67 (Table 5 0 on (negative)	of (65)m s and 5a ts Apr 143.7 ppendix 25.86 Append 294.04 ppendix 51.76 5a) 0 tive valu	only if construction only if c	Jun 143.7 ion L9 o 16.32 uation L 250.88 tion L15 51.76 0 ole 5)	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a) 51.76	Aug 143.7 Iso see 22.92 3a), also 233.62), also se 51.76	Sep 143.7 Table 5 30.76 See Tal 241.9 ee Table 51.76	Oct 143.7 39.06 ole 5 259.53 5 51.76	Nov 143.7 45.59 281.78	Dec 143.7 48.6 302.69 51.76	eating	(66) (67) (68) (69)
Metabolic gair Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances ga (68)m= 316.67 Cooking gains (69)m= 51.76 Pumps and fa (70)m= 0 Losses e.g. ev	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 calcula 51.76 res gains 0 // aporatio -95.8 gains (Table Feb 143.7 (calcula 142 ins (calc	ted in Ap 31.67 (Table 5 0 on (negative)	of (65)m s and 5a ts Apr 143.7 ppendix 25.86 Append 294.04 ppendix 51.76 5a) 0 tive valu	only if construction only if c	Jun 143.7 ion L9 o 16.32 uation L 250.88 tion L15 51.76 0 ole 5)	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a) 51.76	Aug 143.7 Iso see 22.92 3a), also 233.62), also se 51.76	Sep 143.7 Table 5 30.76 See Tal 241.9 ee Table 51.76	Oct 143.7 39.06 ole 5 259.53 5 51.76	Nov 143.7 45.59 281.78	Dec 143.7 48.6 302.69 51.76	eating	(66) (67) (68) (69)
Metabolic gair Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances ga (68)m= 316.67 Cooking gains (69)m= 51.76 Pumps and fa (70)m= 0 Losses e.g. ev (71)m= -95.8 Water heating	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 calcula 51.76 res gains 0 vaporatio 95.8 gains (Table 123.73	ted in Ap 34.16 ulated in 311.67 ted in Ap 51.76 (Table 5 0 on (negation of the second	of (65)m ts Apr 143.7 ppendix 25.86 Appendix 294.04 ppendix 51.76 5a) 0 tive valu -95.8	only if constructions	Jun 143.7 ion L9 o 16.32 uation L 250.88 tion L15 51.76 0 ole 5) -95.8	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a) 51.76	Aug 143.7 Iso see 22.92 3a), also 233.62), also se 51.76	Sep 143.7 Table 5 30.76 0 see Tal 241.9 ee Table 51.76	Oct 143.7 39.06 ole 5 259.53 5 51.76 0 -95.8	Nov 143.7 45.59 281.78 51.76 0	Dec 143.7 48.6 302.69 51.76 0	eating	(66) (67) (68) (69) (70) (71)
Metabolic gair Jan (66)m= 143.7 Lighting gains (67)m= 47.29 Appliances ga (68)m= 316.67 Cooking gains (69)m= 51.76 Pumps and fa (70)m= 0 Losses e.g. ev (71)m= -95.8 Water heating (72)m= 125.84	res (Table Feb 143.7 (calcula 42 ins (calcula 319.95 calcula 51.76 res gains 0 vaporatio 95.8 gains (Table 123.73	ted in Ap 34.16 ulated in 311.67 ted in Ap 51.76 (Table 5 0 on (negation of the second	of (65)m ts Apr 143.7 ppendix 25.86 Appendix 294.04 ppendix 51.76 5a) 0 tive valu -95.8	only if constructions	Jun 143.7 ion L9 o 16.32 uation L 250.88 tion L15 51.76 0 ole 5) -95.8	Jul 143.7 r L9a), a 17.63 13 or L1 236.9 or L15a) 51.76	Aug 143.7 Iso see 22.92 3a), also 233.62), also se 51.76	Sep 143.7 Table 5 30.76 See Tal 241.9 ee Table 51.76 0 -95.8	Oct 143.7 39.06 ole 5 259.53 5 51.76 0 -95.8	Nov 143.7 45.59 281.78 51.76 0	Dec 143.7 48.6 302.69 51.76 0	eating	(66) (67) (68) (69) (70) (71)

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

Orientation: Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast 0.9x 0.77	x	2.9	x	11.28	x	0.4	x	0.8	=	7.26	(75)
Northeast _{0.9x} 0.77	X	5.42	x	11.28	x	0.4	x	0.8	=	13.56	(75)
Northeast 0.9x 0.77	X	2.9	x	22.97	x	0.4	x	0.8	=	14.77	(75)
Northeast 0.9x 0.77	X	5.42	x	22.97	x	0.4	x	0.8] =	27.6	(75)
Northeast 0.9x 0.77	X	2.9	x	41.38	x	0.4	x	0.8	=	26.61	(75)
Northeast 0.9x 0.77	X	5.42	x	41.38	x	0.4	x	0.8	=	49.73	(75)
Northeast _{0.9x} 0.77	X	2.9	x	67.96	X	0.4	X	0.8	=	43.7	(75)
Northeast _{0.9x} 0.77	X	5.42	x	67.96	x	0.4	X	0.8	=	81.68	(75)
Northeast 0.9x 0.77	X	2.9	x	91.35	x	0.4	x	0.8	=	58.74	(75)
Northeast _{0.9x} 0.77	X	5.42	x	91.35	X	0.4	X	0.8	=	109.79	(75)
Northeast _{0.9x} 0.77	X	2.9	x	97.38	x	0.4	X	0.8	=	62.63	(75)
Northeast _{0.9x} 0.77	X	5.42	x	97.38	x	0.4	x	0.8	=	117.05	(75)
Northeast _{0.9x} 0.77	X	2.9	x	91.1	x	0.4	x	0.8	=	58.59	(75)
Northeast _{0.9x} 0.77	X	5.42	x	91.1	x	0.4	X	0.8	=	109.5	(75)
Northeast 0.9x 0.77	X	2.9	x	72.63	x	0.4	x	0.8	=	46.71	(75)
Northeast _{0.9x} 0.77	X	5.42	x	72.63	x	0.4	x	0.8	=	87.29	(75)
Northeast _{0.9x} 0.77	X	2.9	x	50.42	x	0.4	x	0.8	=	32.43	(75)
Northeast 0.9x 0.77	X	5.42	x	50.42	x	0.4	x	0.8	=	60.6	(75)
Northeast _{0.9x} 0.77	X	2.9	x	28.07	x	0.4	x	0.8	=	18.05	(75)
Northeast 0.9x 0.77	X	5.42	x	28.07	x	0.4	x	0.8	=	33.74	(75)
Northeast 0.9x 0.77	X	2.9	x	14.2	x	0.4	x	0.8	=	9.13	(75)
Northeast _{0.9x} 0.77	X	5.42	x	14.2	x	0.4	x	0.8	=	17.06	(75)
Northeast _{0.9x} 0.77	X	2.9	x	9.21	x	0.4	x	0.8	=	5.93	(75)
Northeast _{0.9x} 0.77	X	5.42	x	9.21	X	0.4	X	0.8	=	11.07	(75)
Southeast 0.9x 0.77	X	1.99	X	36.79	x	0.4	X	0.8	=	16.24	(77)
Southeast 0.9x 0.77	X	1.99	x	62.67	x	0.4	x	0.8	=	27.66	(77)
Southeast 0.9x 0.77	X	1.99	x	85.75	x	0.4	x	0.8	=	37.84	(77)
Southeast 0.9x 0.77	x	1.99	x	106.25	x	0.4	x	0.8	=	46.89	(77)
Southeast 0.9x 0.77	X	1.99	x	119.01	x	0.4	x	0.8	=	52.52	(77)
Southeast 0.9x 0.77	X	1.99	x	118.15	x	0.4	x	0.8	=	52.14	(77)
Southeast 0.9x 0.77	X	1.99	x	113.91	x	0.4	X	0.8	=	50.27	(77)
Southeast 0.9x 0.77	X	1.99	x	104.39	x	0.4	X	0.8	=	46.07	(77)
Southeast 0.9x 0.77	X	1.99	x	92.85	X	0.4	X	0.8	=	40.98	(77)
Southeast 0.9x 0.77	X	1.99	x	69.27	x	0.4	X	0.8	=	30.57	(77)
Southeast 0.9x 0.77	X	1.99	x	44.07	x	0.4	x	0.8	=	19.45	(77)
Southeast 0.9x 0.77	x	1.99	x	31.49	x	0.4	x	0.8] =	13.9	(77)
Southwest _{0.9x} 0.77	x	0.91	x	36.79]	0.4	x	0.8] =	14.85	(79)
Southwest _{0.9x} 0.77	x	2.01	x	36.79		0.4	x	0.8] =	32.8	(79)
Southwest _{0.9x} 0.77	x	0.62	x	36.79		0.4	x	0.8] =	5.06	(79)

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Southwest _{0.9x}	0.77	X	0.91	X	62.67		0.4	X	0.8	=	25.3	(79)
Southwest _{0.9x}	0.77	X	2.01	X	62.67		0.4	X	0.8	=	55.87	(79)
Southwest _{0.9x}	0.77	X	0.62	x	62.67		0.4	X	0.8	=	8.62	(79)
Southwest _{0.9x}	0.77	X	0.91	X	85.75		0.4	X	0.8	=	34.61	(79)
Southwest _{0.9x}	0.77	X	2.01	X	85.75		0.4	X	0.8	=	76.45	(79)
Southwest _{0.9x}	0.77	X	0.62	X	85.75		0.4	X	0.8	=	11.79	(79)
Southwest _{0.9x}	0.77	X	0.91	x	106.25		0.4	X	0.8	=	42.88	(79)
Southwest _{0.9x}	0.77	X	2.01	X	106.25		0.4	X	0.8	=	94.72	(79)
Southwest _{0.9x}	0.77	X	0.62	X	106.25		0.4	x	0.8	=	14.61	(79)
Southwest _{0.9x}	0.77	X	0.91	x	119.01		0.4	x	0.8	=	48.03	(79)
Southwest _{0.9x}	0.77	X	2.01	x	119.01		0.4	x	0.8	=	106.1	(79)
Southwest _{0.9x}	0.77	X	0.62	x	119.01		0.4	x	0.8	=	16.36	(79)
Southwest _{0.9x}	0.77	x	0.91	x	118.15		0.4	x	0.8	=	47.69	(79)
Southwest _{0.9x}	0.77	x	2.01	x	118.15		0.4	x	0.8	=	105.33	(79)
Southwest _{0.9x}	0.77	X	0.62	x	118.15		0.4	x	0.8	=	16.24	(79)
Southwest _{0.9x}	0.77	X	0.91	x	113.91		0.4	x	0.8	=	45.97	(79)
Southwest _{0.9x}	0.77	X	2.01	x	113.91		0.4	x	0.8	=	101.55	(79)
Southwest _{0.9x}	0.77	X	0.62	x	113.91		0.4	x	0.8	=	15.66	(79)
Southwest _{0.9x}	0.77	X	0.91	x	104.39		0.4	x	0.8	=	42.13	(79)
Southwest _{0.9x}	0.77	X	2.01	x	104.39		0.4	x	0.8	=	93.06	(79)
Southwest _{0.9x}	0.77	X	0.62	х	104.39		0.4	x	0.8	=	14.35	(79)
Southwest _{0.9x}	0.77	x	0.91	x	92.85	ĺ	0.4	x	0.8] =	37.48	(79)
Southwest _{0.9x}	0.77	x	2.01	x	92.85		0.4	x	0.8] =	82.78	(79)
Southwest _{0.9x}	0.77	X	0.62	x	92.85		0.4	x	0.8] =	12.77	(79)
Southwest _{0.9x}	0.77	x	0.91	x	69.27		0.4	x	0.8	=	27.96	(79)
Southwest _{0.9x}	0.77	X	2.01	x	69.27		0.4	x	0.8	=	61.75	(79)
Southwest _{0.9x}	0.77	x	0.62	x	69.27		0.4	x	0.8	=	9.52	(79)
Southwest _{0.9x}	0.77	x	0.91	x	44.07		0.4	x	0.8	=	17.79	(79)
Southwest _{0.9x}	0.77	X	2.01	x	44.07		0.4	x	0.8	=	39.29	(79)
Southwest _{0.9x}	0.77	X	0.62	x	44.07		0.4	x	0.8	=	6.06	(79)
Southwest _{0.9x}	0.77	X	0.91	x	31.49		0.4	x	0.8	=	12.71	(79)
Southwest _{0.9x}	0.77	X	2.01	x	31.49		0.4	x	0.8	=	28.07	(79)
Southwest _{0.9x}	0.77	X	0.62	х	31.49		0.4	x	0.8	=	4.33	(79)
Northwest 0.9x	0.77	x	1.99	x	11.28	х	0.4	x	0.8] =	4.98	(81)
Northwest 0.9x	0.77	x	0.9	x	11.28	х	0.4	x	0.8] =	2.25	(81)
Northwest 0.9x	0.77	x	1.99	x	22.97	х	0.4	x	0.8] =	10.14	(81)
Northwest 0.9x	0.77	x	0.9	x	22.97	х	0.4	x	0.8	j =	4.58	(81)
Northwest 0.9x	0.77	x	1.99	х	41.38	x	0.4	x	0.8	j =	18.26	(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	1.99	x	67.96	x	0.4	x	0.8] =	29.99	(81)
Northwest _{0.9x}	0.77	x	0.9	x	67.96	x	0.4	x	0.8	j =	13.56	(81)
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Northwest 0.9x	0.77	X	1.9	99	x	9	1.35	x	0.4	x	0.8	=	40.31	(81)
Northwest _{0.9x}	0.77	х	0.	9	x	9	1.35	x	0.4	x	0.8	_ =	18.23	(81)
Northwest 0.9x	0.77	X	1.9	99	x	9	7.38	x	0.4	x	0.8		42.98	(81)
Northwest 0.9x	0.77	X	0.	9	x	9	7.38	x	0.4	x	0.8	=	19.44	(81)
Northwest 0.9x	0.77	x	1.9	99	x	9	91.1	x	0.4	x	0.8	=	40.2	(81)
Northwest 0.9x	0.77	x	0.	9	x	9	91.1	x	0.4	x	0.8	=	18.18	(81)
Northwest 0.9x	0.77	x	1.9	99	x	7.	2.63	х	0.4	x	0.8	=	32.05	(81)
Northwest 0.9x	0.77	x	0.	9	x	7.	2.63	х	0.4	×	0.8	=	14.5	(81)
Northwest 0.9x	0.77	х	1.9	99	x	5	0.42	х	0.4	x	0.8	=	22.25	(81)
Northwest 0.9x	0.77	X	0.	9	x	5	0.42	x	0.4	×	0.8	=	10.06	(81)
Northwest 0.9x	0.77	x	1.9	99	x	2	8.07	х	0.4	x	0.8	=	12.39	(81)
Northwest 0.9x	0.77	х	0.	9	x	2	8.07	х	0.4	x	0.8	=	5.6	(81)
Northwest 0.9x	0.77	x	1.9	99	x	1	14.2	х	0.4	×	0.8	=	6.27	(81)
Northwest 0.9x	0.77	x	0.	9	x	1	14.2	x	0.4	x	0.8	=	2.83	(81)
Northwest 0.9x	0.77	х	1.9	99	x	9	9.21	x	0.4	x	0.8	=	4.07	(81)
Northwest 0.9x	0.77	x	0.	9	x	9	9.21	x	0.4	×	0.8	=	1.84	(81)
_														
Solar gains in	watts, cal	culated	for eac	h mont	h			(83)m	n = Sum(74)m .	(82)m	1			
(83)m= 97		263.55	368.04	450.09	\neg	63.49	439.92	376	.16 299.33	199.5	7 117.87	81.91		(83)
Total gains – i	nternal an	nd solar	(84)m =	- = (73)m	1 + (83)m ,	, watts	•	•		•	•	_	
(84)m= 686.45	759.89	828.41	901.03	950.44	9:	34.49	893.65	837	7.8 779.2	711.5	665.54	656.61		(84)
7. Mean inter	nal tempe	erature (heating	seaso	n)									
					117									
Temperature	during he	`				area f	rom Tab	ole 9	, Th1 (°C)				21	(85)
•	•	eating pe	eriods ir	n the liv	/ing			ole 9	, Th1 (°C)				21	(85)
Temperature Utilisation fac	•	eating pe	eriods ir	n the liv	/ing m (s				, Th1 (°C)	Oc	t Nov	Dec	21	(85)
Utilisation fac	tor for ga	eating pe	eriods ir ving are	n the live a, h1,i	/ing m (s	ee Ta	ble 9a)		ug Sep	Oc 0.89	+	Dec 0.99	21	(85)
Utilisation factors Jan (86)m= 0.99	Feb 0.97	eating pe ins for li Mar 0.94	eriods ir ving are Apr 0.86	n the livea, h1,r May	ving m (s	ee Ta Jun ^{0.5}	ble 9a) Jul 0.36	A 0.	ug Sep 4 0.64		+		21	
Utilisation factors Jan (86)m= 0.99 Mean internal	Feb 0.97 I tempera	eating period ins for limber Mar 0.94 ture in limber 1.00 to 1	eriods ir ving are Apr 0.86	n the livea, h1,r May 0.7	ving m (s v	ee Ta Jun 0.5 ow ste	ble 9a) Jul 0.36 ps 3 to 7	A o.	ug Sep 4 0.64 Table 9c)	0.89	0.97	0.99	21	
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23	Feb 0.97 I tempera 20.37	eating period ins for line Mar 0.94 ture in line 20.59	eriods ir ving are Apr 0.86 iving are	n the livea, h1,r May 0.7 ea T1 (20.95	ring m (s r	Jun 0.5 ow ste	ble 9a) Jul 0.36 ps 3 to 7	0.7 in T	ug Sep 4 0.64 Table 9c) 1 20.98		0.97		21	(86)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23 Temperature	Feb 0.97 I tempera 20.37 during he	eating period ins for line Mar 0.94 ture in line 20.59 eating period in line 20.59	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir	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	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta	A 0.7 in T 2 able 9	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C)	0.89	0.97	0.99	21	(86)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23	Feb 0.97 I tempera 20.37	eating period ins for line Mar 0.94 ture in line 20.59	eriods ir ving are Apr 0.86 iving are	n the livea, h1,r May 0.7 ea T1 (20.95	ring m (s r follo	Jun 0.5 ow ste	ble 9a) Jul 0.36 ps 3 to 7	0.7 in T	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C)	0.89	0.97	0.99	21	(86)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors	Feb 0.97 I tempera 20.37 during he 20.08	eating period ins for lims for relating period 20.08 eating period ins for relating period in the peri	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1 est of d	n the lives, h1,1 May 0.7 ea T1 (20.95 n rest o 20.1 welling	ving m (s	ee Ta Jun 0.5 ow ste 20.99 /elling 20.11 ,m (se	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table	A 0 7 in T 2 able 9 20. 9a)	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11	20.8	0.97	0.99 20.21 20.09	21	(86) (87) (88)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23 Temperature (88)m= 20.08	Feb 0.97 I tempera 20.37 during he	eating period ins for line Mar 0.94 ture in line 20.59 eating period 20.08	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1	n the lives, h1,1,1 May 0.7 ea T1 (20.95 n rest o	ving m (s	ee Ta Jun 0.5 ow ste 20.99 velling 20.11	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.11	A 0.7 in T 2 able 9 20.	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11	0.89	0.97	0.99	21	(86)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors	retor for gain sector for gain	eating period ins for line at	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1 est of d	n the lives, h1,1 May 0.7 ea T1 (20.95 n rest o 20.1 welling 0.64	ving m (s	ee Ta Jun 0.5 ow ste 20.99 velling 20.11 ,m (se 0.43	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29	A 0.7 in T 2 able 9 20. 9a) 0.3	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11	20.8° 20.1	0.97	0.99 20.21 20.09	21	(86) (87) (88)
Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors (89)m= 0.98	retor for gain sector for gain	eating period ins for line at	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1 est of d	n the lives, h1,1 May 0.7 ea T1 (20.95 n rest o 20.1 welling 0.64	ving m (s / / / / / / / / / / / / / / / / / /	ee Ta Jun 0.5 ow ste 20.99 velling 20.11 ,m (se 0.43	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29	A 0.7 in T 2 able 9 20. 9a) 0.3	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table	20.8° 20.1	20.49	0.99 20.21 20.09		(86) (87) (88)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors (89)m= 0.98 Mean interna	Feb 0.97 I tempera 20.37 during he 20.08 etor for gain 1.97 I tempera	eating period ins for line at line in line 20.59 eating period 20.08 ins for reconstruction to the line in the line at line in the line at lin	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1 est of dentity 0.82 he rest	the lives, h1,1 May 0.7 ea T1 (20.95 rest of 20.1 welling 0.64 of dwe	ving m (s / / / / / / / / / / / / / / / / / /	ee Ta Jun 0.5 ow stel 20.99 velling 20.11 ,m (se 0.43	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow ste	A 0 7 in T 2 20 9a) 0.3	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 83 0.56 to 7 in Table 11 20.09	0.89 20.8 20.1 0.85 e 9c) 19.9	20.49	0.99 20.21 20.09 0.99	21	(86) (87) (88) (89)
Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors (89)m= 0.98 Mean internal (90)m= 19.08	retor for gain Feb 0.97 I tempera 20.37 during he 20.08 ctor for gain 0.97 I tempera 19.28	eating period ins for line at	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1 est of do 0.82 he rest 19.9	n the livea, h1,1 May 0.7 ea T1 (20.95 n rest of 20.1 welling 0.64 of dwe 20.06	ving m (s	ee Ta Jun 0.5 ow step 20.99 velling 20.11 ,m (sep 0.43 T2 (fo	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow stee	A 0 7 in T 2 able 9 20 9a) 0.3	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09	0.89 20.8 20.1 0.85 e 9c) 19.9	0.97 1 20.49 20.09 0.96	0.99 20.21 20.09 0.99		(86) (87) (88) (89)
Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors (89)m= 0.98 Mean interna	retor for gain Feb 0.97 I tempera 20.37 during he 20.08 ctor for gain 0.97 I tempera 19.28	eating period ins for line at	eriods ir ving are Apr 0.86 iving are 20.82 eriods ir 20.1 est of do 0.82 he rest 19.9	n the livea, h1,1 May 0.7 ea T1 (20.95 n rest of 20.1 welling 0.64 of dwe 20.06	ving m (s / l l l l l l l l l l l l l l l l l l	ee Ta Jun 0.5 ow step 20.99 velling 20.11 ,m (sep 0.43 T2 (fo	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow stee	A 0 7 in T 2 able 9 20 9a) 0.3	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09 - fLA) × T2	0.89 20.8 20.1 0.85 e 9c) 19.9	0.97 1 20.49 20.09 0.96 19.46 ving area ÷ (4	0.99 20.21 20.09 0.99		(86) (87) (88) (89)
Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.23 Temperature (88)m= 20.08 Utilisation factors (89)m= 0.98 Mean internal (90)m= 19.08	tor for gain Feb 0.97 I tempera 20.37 during he 20.08 ctor for gain 19.28 I tempera 19.68	eating period ins for line at	eriods in ving are Apr 0.86 iving are 20.82 eriods in 20.1 est of do 0.82 he rest 19.9 r the whole 20.24	n the livea, h1,1 May 0.7 ea T1 (20.95 n rest of 20.1 welling 0.64 of dwe 20.06	ving m (s ving follows) / m (s	ee Ta Jun 0.5 ow step 20.99 velling 20.11 ,m (se 0.43 T2 (fo 20.11) g) = fl 20.43	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow ste 20.11 A × T1 20.44	A 0. 7 in T 2 able 9 20. 9a) 0.3 20. + (1 20.	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09	0.89 20.8 20.1 0.85 e 9c) 19.9 £LA = Li	0.97 1 20.49 20.09 0.96 19.46 ving area ÷ (4	0.99 20.21 20.09 0.99 19.05 4) =		(86) (87) (88) (89) (90) (91)
Utilisation factors Jan (86)m=	tor for gain Feb 0.97 I tempera 20.37 during he 20.08 ctor for gain 19.28 I tempera 19.68	eating period ins for line at	eriods in ving are Apr 0.86 iving are 20.82 eriods in 20.1 est of do 0.82 he rest 19.9 r the whole 20.24	n the livea, h1,1 May 0.7 ea T1 (20.95 n rest of 20.1 welling 0.64 of dwe 20.06	ring m (s	ee Ta Jun 0.5 ow step 20.99 velling 20.11 ,m (se 0.43 T2 (fo 20.11) g) = fl 20.43	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow ste 20.11 A × T1 20.44	A 0. 7 in T 2 able 9 20. 9a) 0.3 20. + (1 20.	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09 - fLA) × T2 44 20.42 where approximation in the second seco	0.89 20.8 20.1 0.85 e 9c) 19.9 £LA = Li	0.97 1 20.49 20.09 0.96 19.46 ving area ÷ (4	0.99 20.21 20.09 0.99 19.05 4) =		(86) (87) (88) (89) (90) (91)
Utilisation factors Jan	tor for gales Feb 0.97 I tempera 20.37 during he 20.08 ctor for gales 19.28 I tempera 19.68 ment to the 19.68	eating periods in section of the sec	eriods in ving are Apr 0.86 iving are 20.82 eriods in 20.1 est of dro.82 he rest 19.9 r the what 20.24 internal	the lives, h1,1 May 0.7 ea T1 (20.95 rest of 20.1 welling 0.64 of dwe 20.06	ring m (s	ee Ta Jun 0.5 ow stel 20.99 velling 20.11 ,m (se 0.43 T2 (fo 20.11) g) = fL 20.43 ure from	Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow ste 20.11 _A × T1 20.44 m Table	A A 0.7 in T 2 able 9 20. 9a) 0.3 20. + (1 20. 44e,	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09 - fLA) × T2 44 20.42 where approximation in the second seco	0.89 20.8 20.1 0.85 e 9c) 19.9 fLA = Li copriate	0.97 1 20.49 20.09 0.96 19.46 ving area ÷ (4	0.99 20.21 20.09 0.99 19.05 4) =		(86) (87) (88) (89) (90) (91) (92)
Utilisation factors Jan	tor for garen Feb 0.97 I tempera 20.37 during he 20.08 ctor for garen 0.97 I tempera 19.28 I tempera 19.68 ment to the 19.68 tting requi	eating periods in section of the sec	eriods in ving are Apr 0.86 iving are 20.82 eriods in 20.1 est of d 0.82 he rest 19.9 r the wh 20.24 internal 20.24	ea, h1,1 May 0.7 ea T1 (20.95 n rest o 20.1 welling 0.64 of dwe 20.06	ving m (s / l / l / l / l / l / l / l / l / l /	ee Ta Jun 0.5 ow stel 20.99 velling 20.11 ,m (se 0.43 T2 (fo 20.11) g) = fL 20.43 ure fro 20.43	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow ste 20.11 A × T1 20.44 m Table 20.44	A A 0.7 in T 2 able 9 20. 9a) 0.3 20. + (1 20. 4e, 20.	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09 - fLA) × T2 44 20.42 where approved 44 20.42	0.89 20.8 20.1 0.85 e 9c) 19.9 fLA = Li 20.23	0.97 1 20.49 20.09 0.96 19.46 ving area ÷ (4) 3 19.83	0.99 20.21 20.09 0.99 19.05 4) = 19.47	0.37	(86) (87) (88) (89) (90) (91) (92)
Utilisation factors Jan	tor for garent Feb 0.97 I tempera 20.37 during he 20.08 ctor for garent 19.28 I tempera 19.28 I tempera 19.68 ment to the 19.68 ting requirement interpretary in the 19.68	eating periods in seriods for line and	eriods in ving are Apr 0.86 iving are 20.82 eriods in 20.1 est of d 0.82 he rest 19.9 r the wh 20.24 internal 20.24 enperature	the lives, h1,1 May 0.7 ea T1 (20.95 n rest of 20.1 welling 0.64 of dwe 20.06 cole dw 20.38 tempe 20.38	ring m (s / l / l / l / l / l / l / l / l / l /	ee Ta Jun 0.5 ow stel 20.99 velling 20.11 ,m (se 0.43 T2 (fo 20.11) g) = fL 20.43 ure fro 20.43	ble 9a) Jul 0.36 ps 3 to 7 21 from Ta 20.11 ee Table 0.29 collow ste 20.11 A × T1 20.44 m Table 20.44	A A 0.7 in T 2 able 9 20. 9a) 0.3 20. + (1 20. 4e, 20.	ug Sep 4 0.64 Table 9c) 1 20.98 9, Th2 (°C) 11 20.11 33 0.56 to 7 in Table 11 20.09 - fLA) × T2 44 20.42 where approved 44 20.42	0.89 20.8 20.1 0.85 e 9c) 19.9 fLA = Li 20.23	0.97 1 20.49 20.09 0.96 19.46 ving area ÷ (4) 3 19.83	0.99 20.21 20.09 0.99 19.05 4) = 19.47	0.37	(86) (87) (88) (89) (90) (91) (92)

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Mar

Jan

Feb

Utilisation factor for gains, hm:	0.00	0.50	0.00	0.00			(94)
(94)m= 0.98 0.96 0.92 0.83 0.66 0.46 0.32 Useful gains, hmGm , W = (94)m x (84)m	0.36	0.59	0.86	0.96	0.98		(94)
	297.58	460.06	610.9	638.12	645.07		(95)
Monthly average external temperature from Table 8	<u></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]	•			
(97)m= 1170.84 1135.28 1029.72 855.31 653.16 431.92 284.07 2	298.05	470.63	724.37	963.53	1162.38		(97)
Space heating requirement for each month, kWh/month = 0.024					1		
(98)m= 371.31 271.31 196.13 78.84 19.38 0 0	0	0	84.43	234.29	384.87		(00)
	Total	per year ((kWh/yeai	r) = Sum(9	8)15,912 =	1640.56	(98)
Space heating requirement in kWh/m²/year						21.42	(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. I	0	(301)
	abic 11	<i>,</i> 0 11 110	5110		[= ' '
Fraction of space heat from community system 1 – (301) =					[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	other heat	sources; ti	ne latter	
Fraction of heat from Community heat pump						1	(303a)
Fraction of total space heat from Community heat pump			(3	02) x (303	a) =	1	(304a)
Factor for control and charging method (Table 4c(3)) for communi	nity heat	ina svst	em		Ī	1	(305)
	-	3 - 7 -				Į.	(000)
Distribution loss factor (Table 12c) for community heating system	1	9 - 7 - 1			[1.05	(306)
Distribution loss factor (Table 12c) for community heating system Space heating	1	. 3 - 7 -			 		(306)
	1				 	1.05	(306)
Space heating				5) x (306) ;	 -	1.05 kWh/ye	(306)
Space heating Annual space heating requirement		(98) x (30	04a) x (30	, , ,	 -	1.05 kWh/ye 1640.56	(306) ar
Space heating Annual space heating requirement Space heat from Community heat pump	n Table	(98) x (30 4a or A	04a) x (30	E)	 - 	1.05 kWh/ye 1640.56 1722.59	(306) ar (307a)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system)	n Table	(98) x (30 4a or A	94a) x (309 ppendix	E)	=	1.05 kWh/ye 1640.56 1722.59	(306) ar (307a) (308
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement	n Table	(98) x (30 4a or A	94a) x (309 ppendix	E)	= [1.05 kWh/ye 1640.56 1722.59	(306) ar (307a) (308
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating	n Table m	(98) x (30 4a or A (98) x (30	04a) x (309 ppendix 01) x 100 -	E)		1.05 kWh/ye 1640.56 1722.59 0	(306) ar (307a) (308
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme:	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 1640.56 1722.59 0 0 2083.89	(306) ar (307a) (308 (309)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump	n Table m	(98) x (30 4a or A (98) x (30 (64) x (30	04a) x (309 ppendix 01) x 100 -	E) : (308) = : (306) :	=	1.05 kWh/ye 1640.56 1722.59 0 0 2083.89 2188.09	(306) ar (307a) (308 (309)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution	n Table m 0.01 x	(98) x (30 4a or A (98) x (30 (64) x (30	04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) +	E) : (308) = : (306) :	=	1.05 kWh/ye 1640.56 1722.59 0 0 2083.89 2188.09 39.11	(306) ar (307a) (308 (309) (310a) (313)
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio 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 0.01 ›	(98) x (30) 4a or A (98) x (30) (64) x (30) x [(307a).	04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) +	E) : (308) = : (306) :	=	1.05 kWh/ye 1640.56 1722.59 0 0 2083.89 2188.09 39.11 0	(306) ar (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 0.01 ›	(98) x (30) 4a or A (98) x (30) (64) x (30) x [(307a).	04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) +	E) : (308) = : (306) :	=	1.05 kWh/ye 1640.56 1722.59 0 0 2083.89 2188.09 39.11 0 0	(306) ar (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 (309 ppendix 01) x 100 - 03a) x (309 (307e) +	E) : (308) = : (306) :	=	1.05 kWh/ye 1640.56 1722.59 0 0 2083.89 2188.09 39.11 0 200.92 0	(306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b)
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 0.01 >	(98) x (30) 4a or A (98) x (30) (64) x (30) x [(307a).	04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) +	E) ÷ (308) = 5) x (306) =	=	1.05 kWh/ye 1640.56 1722.59 0 0 2083.89 2188.09 39.11 0 200.92	(306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a)

Energy for lighting (calculated in Appe	endix L)			334.04	(332)
Total delivered energy for all uses (30	7) + (309) + (310) + (312) + (315) + (331) + (33	32)(237b) =	4445.63	(338)
10b. Fuel costs – Community heating	g scheme				
	Fuel kWh/year		el Price ble 12)	Fuel Cost £/year	
Space heating from CHP	(307a) x		4.24 × 0.01 =	73.04	(340a)
Water heating from CHP	(310a) x		4.24 × 0.01 =	92.77	(342a)
Dumpe and fane	(331)	Fue	el Price 13 19		7(0.40)
Pumps and fans	(332)	<u> </u>	10.10	26.5	(349)
Energy for lighting			13.19 X 0.01 =	44.06	(350)
Additional standing charges (Table 12	.)			120	(351)
Total energy cost	= (340a)(342e) + (345)(354) =			356.37	(355)
11b. SAP rating - Community heating	g scheme				
Energy cost deflator (Table 12)				0.42	(356)
Energy cost factor (ECF)	$[(355) \times (356)] \div [(4) + 45.0] =$			1.23	(357)
SAP rating (section12)				82.83	(358)
12b. CO2 Emissions – Community he	· ·				
		ergy	Emission factor		
	kV	Vh/year	kg CO2/kWh	kg CO2/year	
CO2 from other sources of space and Efficiency of heat source 1 (%)		•	•		(367a)
•	water heating (not CHP)	ls repeat (363) to	(366) for the second fue		(367a) (367)
Efficiency of heat source 1 (%)	water heating (not CHP) If there is CHP using two fue	ls repeat (363) to	0 (366) for the second fue	383	」` <u>'</u>
Efficiency of heat source 1 (%) CO2 associated with heat source 1	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x	ls repeat (363) to	0.52 0.52	9l 383 = 529.93	(367)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x x systems (363)(3	ls repeat (363) to	0.52 0.52 0.52	98 383 = 529.93 = 20.3	(367)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (systems (363)(332)) x (secondary) (309) x	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37	0.52 0.52 0.52 0.52 0.52 0.52 0.52	9 383 = 529.93 = 20.3 = 550.23	(367) (372) (373)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (see	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (363)(309) x ersion heater or instantaneous he	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37	0.52 0.52 0.52 0.52 0.52 0.52	9 383 = 529.93 = 20.3 = 550.23 = 0	(367) (372) (373) (374)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (see CO2 associated with water from immediate	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (363)(33) econdary) ersion heater or instantaneous he water heating (373) + (373)	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) =	0.52 0.52 0.52 0.52 0.52 0.22	383 = 529.93 = 20.3 = 550.23 = 0	(367) (372) (373) (374) (375)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (second content of the co	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (363)(33) econdary) ersion heater or instantaneous he water heating (373) + (33) mps and fans within dwelling (333)	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) =	0.52 0.52 0.52 0.52 0.52 0.52 0.52 0.52	383 = 529.93 = 20.3 = 550.23 = 0 = 0	(367) (372) (373) (374) (375) (376)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (see CO2 associated with water from immediately community) Total CO2 associated with space and CO2 associated with electricity for pure	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (363)(3 econdary) ersion heater or instantaneous he water heating (373) + (3 mps and fans within dwelling (33	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) =	0.52 0.52 0.52 0.52 0.52 0.52 0.52 0.52	383 = 529.93 = 20.3 = 550.23 = 0 = 0 550.23 = 104.28	(367) (372) (373) (374) (375) (376) (378)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (see CO2 associated with water from immediate CO2 associated with space and CO2 associated with electricity for puricon CO2 associated with electricity for light	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x [(313) x (363)(332))) x ersion heater or instantaneous heater or instantaneous heater heating mps and fans within dwelling (332))) x	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) =	0.52 0.52 0.52 0.52 0.52 0.52 0.52 0.52	383 529.93 20.3 550.23 0 550.23 104.28 173.37	(367) (372) (373) (374) (375) (376) (378) (379)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (see CO2 associated with water from immediately community) Total CO2 associated with space and CO2 associated with electricity for pure CO2 associated with electricity for light Total CO2, kg/year	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (363)(332) ersion heater or instantaneous heater or instantaneous heater heating mps and fans within dwelling (332))) x sum of (376)(382) =	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) =	0.52 0.52 0.52 0.52 0.52 0.52 0.52 0.52	383 = 529.93 = 20.3 = 550.23 = 0 550.23 = 104.28 = 173.37 827.87	(367) (372) (373) (374) (375) (376) (378) (379) (383)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (see CO2 associated with water from immediate CO2 associated with space and CO2 associated with electricity for pure CO2 associated with electricity for light Total CO2, kg/year Dwelling CO2 Emission Rate	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x (363)(332) Person heater or instantaneous heater or instantaneous heater heating mps and fans within dwelling must an expected the secondary (332)) x sum of (376)(382) = (383) ÷ (4) =	Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) = 11)) x	0.52 0.52 0.52 0.52 0.52 0.52 0.52 0.52	383 529.93 20.3 550.23 0 550.23 104.28 173.37 827.87 10.81 90.88	(367) (372) (373) (374) (375) (376) (378) (379) (383) (384)
Efficiency of heat source 1 (%) CO2 associated with heat source 1 Electrical energy for heat distribution Total CO2 associated with community CO2 associated with space heating (secondary) CO2 associated with water from immediated CO2 associated with space and CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year Dwelling CO2 Emission Rate El rating (section 14)	water heating (not CHP) If there is CHP using two fue [(307b)+(310b)] x [(313) x [(313) x (363)(3 (309) x existens (363)(3 existens (363)(3 existens (373) + (3) existens (373) + (Is repeat (363) to 100 ÷ (367b) x 366) + (368)(37 eater (312) x 374) + (375) =	0.52 0.52 0.52 0.52 0.52 0.52 0.52 0.52	383 529.93 20.3 550.23 0 550.23 104.28 173.37 827.87 10.81	(367) (372) (373) (374) (375) (376) (378) (379) (383) (384)

Energy associated with heat source 1	[(307b)+(310b)] x 100 ÷ (367b) x	3.07	=	3134.67	(367)
Electrical energy for heat distribution	[(313) x		=	120.06	(372)
Total Energy associated with community systems	(363)(366) + (368)(372))	=	3254.72	(373)
if it is negative set (373) to zero (unless specified oth	nerwise, see C7 in Appendix C))		3254.72	(373)
Energy associated with space heating (secondary)	(309) x	0	=	0	(374)
Energy associated with water from immersion heater o	r instantaneous heater(312) x	1.22	=	0	(375)
Total Energy associated with space and water heating	(373) + (374) + (375) =			3254.72	(376)
Energy associated with space cooling	(315) x	3.07	=	0	(377)
Energy associated with electricity for pumps and fans v	within dwelling (331)) x	3.07	=	616.82	(378)
Energy associated with electricity for lighting	(332))) x	3.07	=	1025.51	(379)
Total Primary Energy, kWh/year sur	m of (376)(382) =			4897.05	(383)

		User D	Notaile:						
A Nome -	Dan Tallautt	USELL		- NI	l		CTDO	000000	
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012		Strom Softwa					036639 on: 1.0.5.17	
Cortware realis.		Property	Address		0.011.		7 0 10 10		
Address :									
1. Overall dwelling dime	ensions:								
Ground floor			a(m²)	(1a) x		ight(m)	(2a) =	Volume(m³	(3a)
	a) · (4 b) · (4 a) · (4 d) · (4 a) · (4					.82	(2a) =	215.98	(Ja)
	a)+(1b)+(1c)+(1d)+(1e)+(1	n)7	76.59	(4)	\	I) (O)	(0.)		_
Dwelling volume				(3a)+(3b)+(3c)+(3c	d)+(3e)+	.(3h) =	215.98	(5)
2. Ventilation rate:	main seconda	rv	other		total			m³ per hou	r
Number of chimneys	heating heating	., □ + □		7 = [40 =	-	_
Number of chimneys		╛╘	0	亅	0			0	(6a)
Number of open flues	0 + 0	+	0] = [0		20 =	0	(6b)
Number of intermittent fa				Ļ	0		10 =	0	(7a)
Number of passive vents				Ĺ	0		10 =	0	(7b)
Number of flueless gas f	ires				0	X 4	40 =	0	(7c)
							Air ch	nanges per ho	our
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 fr			. (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 ino great	ior wair 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) 4	1001			0	(14)
Window infiltration			0.25 - [0.2		_	. (1E) _		0	(15)
Infiltration rate	aEO expressed in subject mater	00 nor h	(8) + (10)				oroo	0	(16)
•	q50, expressed in cubic metr lity value, then $(18) = [(17) \div 20] +$	•	•	•	elle oi e	rivelope	area	3	$= \begin{pmatrix} (17) \\ (49) \end{pmatrix}$
·	es if a pressurisation test has been do				is being u	sed		0.15	(18)
Number of sides sheltere		·	,	Í	Ü			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		
								I	

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 effective	_	rate for t	he appli	cable cas	se	<u> </u>	<u> </u>	<u> </u>				
If mechanical ve											0.5	(23
If exhaust air heat p) = (23a)			0.5	(23
If balanced with hea	-	-	_								74.8	(23
a) If balanced m					•		ŕ	`		` ` `	÷ 100] I	(2.4
` '		0.27	0.26	0.25	0.25	0.24	0.25	0.26	0.27	0.28		(24
b) If balanced m		1	ı			, ` ` 	í `	r ´ `		Ι .	I	(2)
,	0 0	0	0	0	0	0	0	0	0	0		(24
c) If whole hous if (22b)m <	e extract vei 0.5 × (23b),			•				.5 × (23b)			
24c)m= 0	0 0	0	0	0	0	0	0	0	0	0		(24
d) If natural ven if (22b)m =	tilation or wh		•	•				0.5]				
24d)m= 0	0 0	0	0	0	0	0	0	0	0	0		(24
Effective air cha	inge rate - e	nter (24a) or (24k	o) or (24c	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 ar	nd heat loss	naramet	≏r·									
LEMENT	Gross area (m²)	Openin		Net Are A ,m		U-val W/m2		A X U (W/I	()	k-value kJ/m²-l		A X k <j k<="" td=""></j>
Doors	alea (III-)	11	ı	2.52	x	0.91	.K 	2.2932	<u> </u>	NJ/IIII	`	(2)
Vindows Type 1				2.9	_	/[1/(1.4)+	!	3.84	=			(27
Vindows Type 2				5.42	_	/[1/(1.4)+	l l	7.19	=			(27
Windows Type 3				1.99	_	/[1/(1.4)+	l l	2.64	=			(27
Nindows Type 4				1.99	_	/[1/(1.4)+	l l	2.64	=			(27
Windows Type 5					_	/[1/(1.4)+	· !		╡			(27
Windows Type 6				0.9	_	/[1/(1.4)+		1.19	╡			
Windows Type 7				0.91	_	/[1/(1.4)+	ļ.	1.21	╡			(27
Windows Type 8				2.01	_	/[1/(1.4)+	ļ.	2.66	╡			(27 (27
Walls Type1	70.47	00.4		0.62	=		—, ¦	0.82	╡ ,			`
L	76.47	22.1	<u> </u>	54.29	x	0.14	=	7.6			_	(29
Malls Type2 [7.05			7.05	X	0.2	=	1.41	ᆜ !		_	(29
Walls Type2	7.05	0	=	24.24		0.47		2.04				
Walls Type3	21.31	0		21.31	x	0.17	=	3.61				(29
Valls Type3 Fotal area of elem	21.31 nents, m ² windows, use of	0 effective w		104.83	3				s given in	n paragraph	3.2	(3
Valls Type3 Total area of elem for windows and root it include the areas or	21.31 Dents, m ² F windows, use on both sides of its	0 effective wi		104.83	3 ated using	formula 1	I		s given in	n paragraph		(3:
Valls Type3 Total area of elem for windows and room * include the areas or Fabric heat loss, \	21.31 nents, m² windows, use of both sides of it. N/K = S (A x	0 effective wi		104.83	3 ated using		/[(1/U-valu) + (32) =	ue)+0.04] a			40.98	(3:
Valls Type3 Total area of elem for windows and rook include the areas or abric heat loss, \ Heat capacity Cm	21.31 nents, m² if windows, use of both sides of it N/K = S (A x k)	effective winternal wal	ls and par	104.83 alue calcula titions	3 ated using	formula 1	/[(1/U-valu + (32) = ((28)		2) + (32a)		40.98	(3
Valls Type3 Total area of elem for windows and room in include the areas or Fabric heat loss, \	21.31 nents, m² i windows, use on both sides of in N/K = S (A x k) rameter (TM)	o effective winternal wall U) P = Cm -	ls and par - TFA) ir	104.83 alue calcula titions	3 ated using	g formula 1	/[(1/U-valu) + (32) = ((28) Indica	ue)+0.04] a(30) + (32) tive Value	2) + (32a) : Medium	(32e) =	40.98	(3

antilation he	ant loop of	alaulatad	l manthl					(33) +	= 0.33 × (25\m v (5)	L	56.46	(3
entilation he	1			<u> </u>	1	T 11	A	` ,	,				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(2
8)m= 20.57	20.34	20.11	18.98	18.75	17.61	17.61	17.39	18.07	18.75	19.2	19.66		(3
eat transfer	coefficie	nt, W/K						(39)m	= (37) + (3	38)m			
9)m= 77.02	76.8	76.57	75.43	75.21	74.07	74.07	73.84	74.52	75.21	75.66	76.12		
eat loss pai	ramatar (l	//۱۸ (ط الـ	m2K						Average = = (39)m ÷		12 /12=	75.38	(3
0)m= 1.01	1	1	0.98	0.98	0.97	0.97	0.96	0.97	0.98	0.99	0.99		
1.01	ļ '	_ '	0.90	0.90	0.97	0.37	0.90		Average =			0.98	\(4
umber of da	ays in mo	nth (Tabl	le 1a)					,	- Tverage	Juiii(40)1.	12 / 12-	0.90	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1)m= 31	28	31	30	31	30	31	31	30	31	30	31		(4
	1			ı									
Water be	oting one	rav roqui	romont:								kWh/ye	vor:	
. Water he	aling ene	rgy requi	rement.								KVVII/ye	di.	
sumed occ											39		(-
if TFA > 13		+ 1.76 x	[1 - exp	(-0.0003	849 x (TI	FA -13.9)2)] + 0.0	0013 x (T	ΓFA -13.	9)			
if TFA £ 13	•	otor ucoc	no in litro	o por de	w Vd ov	orogo –	(25 v NI)	. 26					,
inual avera	_		•	•	•	_	` ,		se target o		.08		(•
more that 12	_				_	-			J				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
t water usage						l .		Cop					
	00.55	92.9	89.26	85.62	81.97	81.97	85.62	89.26	92.9	96.55	100.19		
m= 100.19	96.55			l									
l)m= 100.19	90.55								Total = Su	m(44) ₁₁₂ =	•	1092.97	<u> </u>
		used - cal	culated m	onthly = 4 .	190 x Vd,ı	m x nm x E	OTm / 3600			(/	L	1092.97	(4
ergy content	of hot water	used - cal	culated mo	onthly = 4.	190 x Vd,r 96.8	m x nm x E 89.7	0Tm / 3600 102.93			(/	L	1092.97	(4
ergy content	of hot water						-	104.16	121.39	132.5	c, 1d) 143.89	1092.97	`
ergy content (c)m= 148.58	of hot water 3 129.95	134.09	116.91	112.17	96.8	89.7	102.93	104.16	nth (see Ta	132.5	c, 1d) 143.89		
ergy content of the stantaneous	of hot water 3 129.95 water heati	134.09	116.91	112.17	96.8	89.7	102.93	104.16	121.39	132.5	c, 1d) 143.89		((
ergy content of the sergy cont	of hot water 3 129.95 water heati	134.09	116.91 of use (no	112.17 hot water	96.8	89.7 enter 0 in	102.93 boxes (46)	104.16 to (61)	121.39 Total = Sur	132.5 m(45) ₁₁₂ =	c, 1d)		((
ergy content of 148.58 instantaneous instantaneous instantaneous instantaneous instantaneous instantaneous	of hot water 3 129.95 water heati 19.49 e loss:	134.09 ng at point 20.11	116.91 of use (no	112.17 hot water 16.83	96.8 r storage), 14.52	89.7 enter 0 in	102.93 boxes (46) 15.44	104.16 106.16 106.62	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ =	c, 1d)		(,
ergy content of the stantaneous of the stantaneous attention and the stantaneous of the s	of hot water 3 129.95 water heati 19.49 e loss: me (litres)	134.09 ng at point 20.11 including	116.91 of use (no 17.54 ag any so	112.17 hot water 16.83	96.8 r storage), 14.52 /WHRS	89.7 enter 0 in 13.45 storage	102.93 boxes (46) 15.44 within sa	104.16 106.16 106.62	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ =	c, 1d) 143.89 - 21.58		
ergy content of the stantaneous signature storage orage voluments.	of hot water 3 129.95 water heating 19.49 e loss: me (litres) heating a no stored	134.09 ng at point 20.11 including and no ta	of use (no 17.54 ag any so	112.17 hot water 16.83 clar or W yelling, e	96.8 r storage), 14.52 /WHRS	enter 0 in 13.45 storage	102.93 boxes (46) 15.44 within sa (47)	104.16 104.16 1 to (61) 15.62	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ =	c, 1d) 143.89 - 21.58		(,
ergy content of the stantaneous of the stantaneous of the stantaneous orage voluments orage voluments orage voluments orage orage voluments orage voluments orage voluments orage voluments orage voluments orage voluments or the stantaneous orage orage or the stantaneous orage	water heating a no stored e loss:	134.09 ng at point 20.11 including and no tall hot water	of use (no 17.54 ag any so nk in dw er (this in	112.17 hot water 16.83 Dlar or W velling, e	96.8 r storage), 14.52 /WHRS enter 110 nstantar	enter 0 in 13.45 storage 0 litres in	102.93 boxes (46) 15.44 within sa (47)	104.16 104.16 1 to (61) 15.62	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ =	c, 1d) 143.89 - 21.58		(,
ergy content of the stantaneous of the storage voluments of the storage orage voluments of the storage of the s	water heating a no stored e loss: cturer's de	134.09 ng at point 20.11 including and no tale hot water	of use (not) 17.54 Ing any so ank in dwer (this in oss factors)	112.17 hot water 16.83 Dlar or W velling, e	96.8 r storage), 14.52 /WHRS enter 110 nstantar	enter 0 in 13.45 storage 0 litres in	102.93 boxes (46) 15.44 within sa (47)	104.16 104.16 1 to (61) 15.62	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88	c, 1d) 143.89 - 21.58		(4)
ergy content of the stantaneous	water heating a ho stored e loss: cturer's defactor fro	134.09 ng at point 20.11 including and no tale hot water eclared learning to the color of the	of use (not) 17.54 ag any so ank in dwer (this in oss factor 2b	112.17 that water 16.83 colar or Water velling, encludes in	96.8 r storage), 14.52 /WHRS enter 110 nstantar	enter 0 in 13.45 storage litres in neous co	102.93 boxes (46) 15.44 within sa (47) embi boile	104.16 104.16 10 to (61) 15.62 ame vess ers) ente	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88	c, 1d) 143.89 21.58		(4)
ergy content of the stantaneous of the storage voluments of the storage of the st	water heating a heating a factor from water	134.09 ng at point 20.11 including and no tale hot water eclared learn Table storage	of use (not) 17.54 ag any so ank in dwer (this in oss factor) 2b , kWh/ye	112.17 hot water 16.83 plar or W velling, e ncludes i or is kno	96.8 r storage), 14.52 /WHRS enter 110 nstantar wn (kWh	enter 0 in 13.45 storage litres in neous co	102.93 boxes (46) 15.44 within sa (47)	104.16 104.16 10 to (61) 15.62 ame vess ers) ente	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88	c, 1d) 143.89 21.58		(4)
ergy content of the property content of the property content of the property community therwise if the property content of the pro	water heating a no stored e loss: cturer's de factor from water	134.09 ng at point 20.11 including and no tale hot water eclared learning are storage eclared to the colored are storage eclared to the colored are storage.	of use (not) 17.54 ag any so ank in dwer (this in coss factors, kWh/ye cylinder left)	112.17 hot water 16.83 clar or W velling, encludes if	96.8 r storage), 14.52 /WHRS enter 110 enstantar wn (kWheet	enter 0 in 13.45 storage 0 litres in neous con/day):	102.93 boxes (46) 15.44 within sa (47) embi boile	104.16 104.16 10 to (61) 15.62 ame vess ers) ente	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88	c, 1d) 143.89 21.58 0 0 10		(A)
ergy content of the stantaneous of the stantaneous of the stantaneous orage voluments of the stantaneous of	water heating a ho stored e loss: cturer's de factor from water cturer's de prage loss	134.09 ng at point 20.11 including and no tale hot water eclared learn Table and Table eclared contact for a factor fr	of use (not) 17.54 ag any so ank in dwer (this in coss factor 2b , kWh/ye cylinder loom Table	112.17 hot water 16.83 clar or W velling, encludes if	96.8 r storage), 14.52 /WHRS enter 110 enstantar wn (kWheet	enter 0 in 13.45 storage 0 litres in neous con/day):	102.93 boxes (46) 15.44 within sa (47) embi boile	104.16 104.16 10 to (61) 15.62 ame vess ers) ente	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88	c, 1d) 143.89 21.58 0		(A)
ergy content of the standard programment of the standard p	water heating a ho stored e loss: cturer's de factor from water cturer's de prage loss heating s	134.09 ng at point 20.11 including and no tale and the water eclared learn Table are storage eclared of factor frice e sections.	of use (not) 17.54 ag any so ank in dwer (this in coss factor 2b , kWh/ye cylinder loom Table	112.17 hot water 16.83 clar or W velling, encludes if	96.8 r storage), 14.52 /WHRS enter 110 enstantar wn (kWheet	enter 0 in 13.45 storage 0 litres in neous con/day):	102.93 boxes (46) 15.44 within sa (47) embi boile	104.16 104.16 10 to (61) 15.62 ame vess ers) ente	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88	c, 1d) 143.89 21.58 0 0 10 02		
ergy content of the community of the com	water heating a no stored e loss: cturer's de factor from water cturer's de factor from water cturer's de factor from water cturer's de factor from the factor from water cturer's de factor from water cturer's de factor from Ta	134.09 ng at point 20.11 including and no tale and no tale and reclared learn Table are storage eclared of factor from the section of the s	of use (not) 17.54 ag any so ank in dwer (this in coss factor 2b by kWh/ye by linder I com Table on 4.3	112.17 hot water 16.83 clar or W velling, encludes if	96.8 r storage), 14.52 /WHRS enter 110 enstantar wn (kWheet	enter 0 in 13.45 storage 0 litres in neous con/day):	102.93 boxes (46) 15.44 within sa (47) embi boile	104.16 104.16 10 to (61) 15.62 ame vess ers) ente	121.39 Total = Sur 18.21	132.5 m(45) ₁₁₂ = 19.88 47)	c, 1d) 143.89 21.58 0 0 0 0 00 00 00 00 00 00		(A)
ergy content of 5)m= 148.58	water heating a no stored e loss: cturer's de factor from water cturer's de prage loss heating s or from Ta factor fro	134.09 ng at point 20.11 including and no tale hot water the colored learned to the colored factor from the colored factor factor from the colored f	of use (not) 17.54 ag any so ank in dwer (this in coss factors, kWh/ye cylinder later and the com Table on 4.3	112.17 hot water 16.83 clar or W yelling, encludes i or is known is know	96.8 r storage), 14.52 /WHRS enter 110 enstantar wn (kWheet	enter 0 in 13.45 storage 0 litres in neous con/day): known:	102.93 boxes (46) 15.44 within sa (47) embi boile	104.16 104.16 10 to (61) 15.62 ame vess	121.39 Total = Sur 18.21 sel er '0' in (132.5 m(45) ₁₁₂ = 19.88 47)	c, 1d) 143.89 21.58 0 0 10 02		(4

Water Storage 1033 C	alculated	for each	month			((56)m = (55) × (41)ı	m				
(56)m= 32.01 28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(56)
If cylinder contains dedica	ted solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m= 32.01 28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Primary circuit loss (annual) fro	om Table	3							0		(58)
Primary circuit loss of	alculated	for each	month (59)m = ((58) ÷ 36	65 × (41)	m					
(modified by factor	from Tab	le H5 if t	here is s	solar 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 calculate	d for each	month ((61)m =	(60) ÷ 36	65 × (41))m						
(61)m= 0 0	0	0	0	0	0	0	0	0	0	0		(61)
Total heat required for	or water h	eating ca	alculated	for eacl	h month	(62)m =	0.85 × ((45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 203.85 179.8	7 189.37	170.4	167.45	150.29	144.97	158.21	157.65	176.66	186	199.17		(62)
Solar DHW input calculate	d using App	endix G or	Appendix	H (negati	ve quantity	/) (enter '0	' if no sola	r contribut	ion to wate	er heating)	•	
(add additional lines	if FGHRS	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 he	ater	-		-	-	-	-	-	-	-		
(64)m= 203.85 179.8	7 189.37	170.4	167.45	150.29	144.97	158.21	157.65	176.66	186	199.17		
1	!					Outp	out from wa	ater heate	r (annual)₁	12	2083.89	(64)
Heat gains from water	er heating	kWh/mo	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 x	c [(46)m	+ (57)m	+ (59)m]	_
(65)m= 93.62 83.15	88.81	81.67	81.52	74.98	74.05	78.45	77.43	84.58	86.85	92.06		(65)
include (57)m in ca	alculation	of (65)m	l '£ -	<u> </u>	·	!		<u> </u>				
` '		01 (65)111	only if c	ylınder i	s in the d	dwelling	or hot w	ater is fr	om com	munity h	eating	
5. Internal gains (s			•	ylinder i	s in the d	dwelling	or hot w	ater is fr	om com	munity h	eating	
5. Internal gains (s	ee Table 5	and 5a	•	ylinder i	s in the d	dwelling	or hot w	ater is fr	om com	munity h	eating	
5. Internal gains (s Metabolic gains (Tab	ee Table 5	and 5a	•	Jun	s in the o			ater is fr	om com	munity h	eating	
Metabolic gains (Tab	ee Table 5 le 5), Wat Mar	and 5a):		ı	Aug	Sep	•	ı	ı	eating	(66)
Jan Feb (66)m= 119.75 119.7	le 5), Wat Mar 119.75	ts Apr 119.75	May	Jun 119.75	Jul 119.75	Aug 119.75	Sep 119.75	Oct	Nov	Dec	eating	(66)
Metabolic gains (Tab	le 5), Wat Mar 119.75	ts Apr 119.75	May	Jun 119.75	Jul 119.75	Aug 119.75	Sep 119.75	Oct	Nov	Dec	eating	(66)
Metabolic gains (Tab Jan Feb (66)m= 119.75 119.7 Lighting gains (calcumum) 16.8	le 5), Wat Mar 119.75 lated in Ap	ts Apr 119.75 Appendix 10.34	May 119.75 L, equati	Jun 119.75 ion L9 o	Jul 119.75 r L9a), a 7.05	Aug 119.75 Iso see	Sep 119.75 Table 5	Oct 119.75	Nov 119.75	Dec 119.75	eating	, ,
Metabolic gains (Tab Jan Feb (66)m= 119.75 119.7 Lighting gains (calcument) (67)m= 18.91 16.8 Appliances gains (calcument)	le 5), Wat Mar 119.75 lated in Ap 13.66 lculated ir	ts Apr 119.75 Appendix 10.34	May 119.75 L, equati	Jun 119.75 ion L9 o	Jul 119.75 r L9a), a 7.05	Aug 119.75 Iso see	Sep 119.75 Table 5	Oct 119.75	Nov 119.75	Dec 119.75	eating	, ,
Metabolic gains (Table Jan Feb. 19.75 Jan Feb. 119.75 119.75 Lighting gains (calculation) (67)m= 18.91 16.8 Appliances gains (calculation) (68)m= 212.17 214.3	le 5), Wate Mar Mar 119.75 lated in Ap 13.66 lculated ir 7 208.82	ts	May 119.75 L, equati 7.73 dix L, eq 182.1	Jun 119.75 ion L9 o 6.53 uation L 168.09	Jul 119.75 r L9a), a 7.05 13 or L1 158.73	Aug 119.75 Iso see 9.17 3a), also 156.52	Sep 119.75 Table 5 12.31 see Tal 162.07	Oct 119.75 15.62 ble 5 173.88	Nov 119.75	Dec 119.75	eating	(67)
Metabolic gains (Tab Jan Feb (66)m= 119.75 119.7 Lighting gains (calcument) (67)m= 18.91 16.8 Appliances gains (calcument)	le 5), Wate Mar Mar Mated in Ap 13.66 Iculated ir 208.82 Iated in A	ts	May 119.75 L, equati 7.73 dix L, eq 182.1	Jun 119.75 ion L9 o 6.53 uation L 168.09	Jul 119.75 r L9a), a 7.05 13 or L1 158.73	Aug 119.75 Iso see 9.17 3a), also 156.52	Sep 119.75 Table 5 12.31 see Tal 162.07	Oct 119.75 15.62 ble 5 173.88	Nov 119.75	Dec 119.75	eating	(67)
Metabolic gains (Tab Jan Feb (66)m= 119.75 119.7 Lighting gains (calcumate (67)m= 18.91 16.8 Appliances gains (canonic (68)m= 212.17 214.3 Cooking gains (calcumate (69)m= 34.97 34.97	le 5), Wat Mar Mar Mated in Ap 13.66 Iculated ir 208.82 Iated in A 34.97	ts	May 119.75 L, equati 7.73 dix L, equate 182.1 L, equate	Jun 119.75 ion L9 of 6.53 uation L 168.09	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a)	Aug 119.75 Iso see 9.17 3a), also 156.52	Sep 119.75 Table 5 12.31 see Tal 162.07	Oct 119.75 15.62 ble 5 173.88	Nov 119.75 18.24 188.79	Dec 119.75 19.44 202.81	eating	(67) (68)
Metabolic gains (Tab Jan Feb (66)m= 119.75 119.7 Lighting gains (calcumate) 16.8 Appliances gains (calcumate) 16.8 Appliances gains (calcumate) 212.17 214.3 Cooking gains (calcumate) 16.8	le 5), Wat Mar Mar Mated in Ap 13.66 Iculated ir 208.82 Iated in A 34.97	ts	May 119.75 L, equati 7.73 dix L, equate 182.1 L, equate	Jun 119.75 ion L9 of 6.53 uation L 168.09	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a)	Aug 119.75 Iso see 9.17 3a), also 156.52	Sep 119.75 Table 5 12.31 see Tal 162.07	Oct 119.75 15.62 ble 5 173.88	Nov 119.75 18.24 188.79	Dec 119.75 19.44 202.81	eating	(67) (68)
Metabolic gains (Tab Jan Feb (66)m= 119.75 119.7 Lighting gains (calcu (67)m= 18.91 16.8 Appliances gains (ca (68)m= 212.17 214.3 Cooking gains (calcu (69)m= 34.97 34.97 Pumps and fans gain (70)m= 0 0	le 5), Wate Mar	ts Apr 119.75 Appendix 10.34 Appendix 197.01 Appendix 34.97 5a) 0	May 119.75 L, equati 7.73 dix L, equat 182.1 L, equat 34.97	Jun 119.75 ion L9 of 6.53 uation L 168.09 tion L15 34.97	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a) 34.97	Aug 119.75 Iso see 9.17 3a), also 156.52), also se 34.97	Sep 119.75 Table 5 12.31 see Tal 162.07 ee Table 34.97	Oct 119.75 15.62 ble 5 173.88 5 34.97	Nov 119.75 18.24 188.79	Dec 119.75 19.44 202.81 34.97	eating	(67) (68) (69)
Metabolic gains (Tab. Jan Feb. (66)m= 119.75 119.7 Lighting gains (calcumus (67)m= 18.91 16.8 Appliances gains (calcumus (68)m= 212.17 214.3 Cooking gains (calcumus (69)m= 34.97 34.97 Pumps and fans gain	le 5), Wate Mar	ts Apr 119.75 Appendix 10.34 Appendix 197.01 Appendix 34.97 5a) 0	May 119.75 L, equati 7.73 dix L, equat 182.1 L, equat 34.97	Jun 119.75 ion L9 of 6.53 uation L 168.09 tion L15 34.97	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a) 34.97	Aug 119.75 Iso see 9.17 3a), also 156.52), also se 34.97	Sep 119.75 Table 5 12.31 see Tal 162.07 ee Table 34.97	Oct 119.75 15.62 ble 5 173.88 5 34.97	Nov 119.75 18.24 188.79	Dec 119.75 19.44 202.81 34.97	eating	(67) (68) (69)
Metabolic gains (Tab. Jan	le 5), Wat Mar Mar Mar Mated in Ap Maced i	ts Apr 119.75 Appendix 10.34 Appendix 197.01 Appendix 34.97 5a) 0 tive valu	May 119.75 L, equati 7.73 dix L, eq 182.1 L, equati 34.97 0 es) (Tab	Jun 119.75 ion L9 of 6.53 uation L 168.09 tion L15 34.97	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a) 34.97	Aug 119.75 Iso see 9.17 3a), also 156.52 , also se 34.97	Sep 119.75 Table 5 12.31 see Tal 162.07 ee Table 34.97	Oct 119.75 15.62 ble 5 173.88 5 34.97	Nov 119.75 18.24 188.79 34.97	Dec 119.75 19.44 202.81 34.97	eating	(67) (68) (69) (70)
Metabolic gains (Tabulan Jan Feb. Jan Feb. 119.75 119.7 119.7 Lighting gains (calculant (67)m= 18.91 16.8 Appliances gains (calculant (68)m= 212.17 214.3 Cooking gains (calculant (69)m= 34.97 34.97 Pumps and fans gain (70)m= 0 0 Losses e.g. evapora	le 5), Wat Mar	ts Apr 119.75 Appendix 10.34 Appendix 197.01 Appendix 34.97 5a) 0 tive valu	May 119.75 L, equati 7.73 dix L, eq 182.1 L, equati 34.97 0 es) (Tab	Jun 119.75 ion L9 of 6.53 uation L 168.09 tion L15 34.97	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a) 34.97	Aug 119.75 Iso see 9.17 3a), also 156.52 , also se 34.97	Sep 119.75 Table 5 12.31 see Tal 162.07 ee Table 34.97	Oct 119.75 15.62 ble 5 173.88 5 34.97	Nov 119.75 18.24 188.79 34.97	Dec 119.75 19.44 202.81 34.97	eating	(67) (68) (69) (70)
Metabolic gains (Take Jan Feb. 119.75 119.7 119.7 119.7 119.7 119.7 Lighting gains (calculofo) (67)m= 18.91 16.8 Appliances gains (calculofo) (68)m= 212.17 214.3 Cooking gains (calculofo) (69)m= 34.97 34.97 Pumps and fans gain (70)m= 0 0 Losses e.g. evapora (71)m= -95.8 -95.8 Water heating gains (72)m= 125.84 123.7	le 5), Wat Mar	ts Apr 119.75 ppendix 10.34 Appendix 197.01 ppendix 34.97 5a) 0 tive valu -95.8	May 119.75 L, equati 7.73 dix L, equati 182.1 L, equati 34.97 0 es) (Tab -95.8	Jun 119.75 ion L9 of 6.53 uation L 168.09 tion L15 34.97 0 ole 5) -95.8	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a) 34.97	Aug 119.75 Iso see 9.17 3a), also 156.52 , also se 34.97 0	Sep 119.75 Table 5 12.31 see Tal 162.07 ee Table 34.97 0	Oct 119.75 15.62 ble 5 173.88 5 34.97 0 -95.8	Nov 119.75 18.24 188.79 34.97 0	Dec 119.75 19.44 202.81 34.97 0 -95.8	eating	(67) (68) (69) (70) (71)
Metabolic gains (Tab Jan Feb Jan Feb 119.75 119.7 Lighting gains (calcu (67)m= 18.91 16.8 Appliances gains (ca (68)m= 212.17 214.3 Cooking gains (calcu (69)m= 34.97 34.97 Pumps and fans gain (70)m= 0 0 Losses e.g. evapora (71)m= -95.8 -95.8 Water heating gains	le 5), Wat Mar	ts Apr 119.75 ppendix 10.34 Appendix 197.01 ppendix 34.97 5a) 0 tive valu -95.8	May 119.75 L, equati 7.73 dix L, equati 182.1 L, equati 34.97 0 es) (Tab -95.8	Jun 119.75 ion L9 of 6.53 uation L 168.09 tion L15 34.97 0 ole 5) -95.8	Jul 119.75 r L9a), a 7.05 13 or L1 158.73 or L15a) 34.97 0	Aug 119.75 Iso see 9.17 3a), also 156.52 , also se 34.97 0	Sep 119.75 Table 5 12.31 see Tal 162.07 ee Table 34.97 0	Oct 119.75 15.62 ble 5 173.88 5 34.97 0 -95.8	Nov 119.75 18.24 188.79 34.97 0	Dec 119.75 19.44 202.81 34.97 0 -95.8	eating	(67) (68) (69) (70) (71)

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

Orientation: Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast 0.9x 0.77	x	2.9	x	11.28	x	0.4	x	0.8	=	7.26	(75)
Northeast _{0.9x} 0.77	X	5.42	x	11.28	x	0.4	x	0.8	=	13.56	(75)
Northeast 0.9x 0.77	X	2.9	x	22.97	x	0.4	x	0.8	=	14.77	(75)
Northeast 0.9x 0.77	X	5.42	x	22.97	x	0.4	x	0.8] =	27.6	(75)
Northeast 0.9x 0.77	X	2.9	x	41.38	x	0.4	x	0.8	=	26.61	(75)
Northeast 0.9x 0.77	X	5.42	x	41.38	x	0.4	x	0.8	=	49.73	(75)
Northeast _{0.9x} 0.77	X	2.9	x	67.96	X	0.4	X	0.8	=	43.7	(75)
Northeast _{0.9x} 0.77	X	5.42	x	67.96	x	0.4	X	0.8	=	81.68	(75)
Northeast _{0.9x} 0.77	X	2.9	x	91.35	x	0.4	x	0.8	=	58.74	(75)
Northeast _{0.9x} 0.77	X	5.42	x	91.35	X	0.4	X	0.8	=	109.79	(75)
Northeast _{0.9x} 0.77	X	2.9	x	97.38	x	0.4	X	0.8	=	62.63	(75)
Northeast _{0.9x} 0.77	X	5.42	x	97.38	x	0.4	x	0.8	=	117.05	(75)
Northeast _{0.9x} 0.77	X	2.9	x	91.1	x	0.4	x	0.8	=	58.59	(75)
Northeast _{0.9x} 0.77	X	5.42	x	91.1	x	0.4	X	0.8	=	109.5	(75)
Northeast 0.9x 0.77	X	2.9	x	72.63	x	0.4	x	0.8	=	46.71	(75)
Northeast _{0.9x} 0.77	X	5.42	x	72.63	x	0.4	x	0.8	=	87.29	(75)
Northeast _{0.9x} 0.77	X	2.9	x	50.42	x	0.4	x	0.8	=	32.43	(75)
Northeast 0.9x 0.77	X	5.42	x	50.42	x	0.4	x	0.8	=	60.6	(75)
Northeast _{0.9x} 0.77	X	2.9	x	28.07	x	0.4	x	0.8	=	18.05	(75)
Northeast 0.9x 0.77	X	5.42	x	28.07	x	0.4	x	0.8	=	33.74	(75)
Northeast 0.9x 0.77	X	2.9	x	14.2	x	0.4	x	0.8	=	9.13	(75)
Northeast _{0.9x} 0.77	X	5.42	x	14.2	x	0.4	x	0.8	=	17.06	(75)
Northeast _{0.9x} 0.77	X	2.9	x	9.21	x	0.4	x	0.8	=	5.93	(75)
Northeast 0.9x 0.77	X	5.42	x	9.21	X	0.4	X	0.8	=	11.07	(75)
Southeast 0.9x 0.77	X	1.99	x	36.79	x	0.4	X	0.8	=	16.24	(77)
Southeast 0.9x 0.77	X	1.99	x	62.67	x	0.4	x	0.8	=	27.66	(77)
Southeast 0.9x 0.77	X	1.99	x	85.75	x	0.4	x	0.8	=	37.84	(77)
Southeast 0.9x 0.77	x	1.99	x	106.25	x	0.4	x	0.8	=	46.89	(77)
Southeast 0.9x 0.77	X	1.99	x	119.01	x	0.4	x	0.8	=	52.52	(77)
Southeast 0.9x 0.77	X	1.99	x	118.15	x	0.4	x	0.8	=	52.14	(77)
Southeast 0.9x 0.77	X	1.99	x	113.91	x	0.4	X	0.8	=	50.27	(77)
Southeast 0.9x 0.77	X	1.99	x	104.39	x	0.4	X	0.8	=	46.07	(77)
Southeast 0.9x 0.77	X	1.99	x	92.85	X	0.4	X	0.8	=	40.98	(77)
Southeast 0.9x 0.77	X	1.99	x	69.27	x	0.4	X	0.8	=	30.57	(77)
Southeast 0.9x 0.77	X	1.99	x	44.07	x	0.4	x	0.8	=	19.45	(77)
Southeast 0.9x 0.77	x	1.99	x	31.49	x	0.4	x	0.8] =	13.9	(77)
Southwest _{0.9x} 0.77	x	0.91	x	36.79]	0.4	x	0.8] =	14.85	(79)
Southwest _{0.9x} 0.77	x	2.01	x	36.79		0.4	x	0.8] =	32.8	(79)
Southwest _{0.9x} 0.77	x	0.62	x	36.79		0.4	x	0.8] =	5.06	(79)

Southwest _{0.9x}	0.77	1 ,	0.04	1 ,	60.67	1	0.4	1 ,	0.0	1 _	25.2	(79)
Southwest _{0.9x}	0.77] x] ,,	0.91] X] ,	62.67]]	0.4	l x	0.8] =	25.3	=
Southwest _{0.9x}	0.77] x] ,	2.01] X] v	62.67]]	0.4	X	0.8] =] _	55.87	(79)
Southwest _{0.9x}	0.77] x] x	0.62	x x	62.67]]	0.4	x x	0.8] =] =	8.62	
Southwest _{0.9x}	0.77]]	0.91] 1	85.75]]	0.4]]	0.8]]	34.61	(79)
Southwest _{0.9x}	0.77]	2.01] X] v	85.75]]	0.4	l x	0.8] = 1 _	76.45	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77] x] x	0.62] x] x	85.75]]	0.4	x x	0.8] =] =	11.79	(79)
Southwest _{0.9x}	0.77] ^] x	2.01] ^] x	106.25]]	0.4] ^] _x	0.8] =	94.72	(79)
Southwest _{0.9x}] ^] x] ^] x]]		, ^ x] -] =		(79)
Southwest _{0.9x}	0.77] ^] x	0.62] ^] x	106.25]]	0.4) ^ x	0.8] =] =	14.61 48.03	(79)
Southwest _{0.9x}] ^] x]]]]		^ x]]		(79)
Southwest _{0.9x}	0.77] 1	2.01] ×] v	119.01]]	0.4) ^ x	0.8] =] =	106.1	(79)
Southwest _{0.9x}	0.77]	0.62] X] v	119.01]]	0.4]]	0.8] 1	16.36	(79)
Southwest _{0.9x}	0.77] x] ,	0.91] X] v	118.15]]	0.4	l x	0.8] =] _	47.69	= (79) (79)
Southwest _{0.9x}	0.77]	2.01] X] v	118.15]]	0.4	l x	0.8] =] =	105.33	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77] x] ,	0.62] X] v	118.15]]	0.4	X I v	0.8] 1	16.24	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77	」× 1、	0.91] X] v	113.91]]	0.4	l x	0.8] =] _	45.97	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77]	2.01] X] v	113.91]]	0.4	l x	0.8] = 1 _	101.55	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77]	0.62] X] v	113.91]]	0.4	X I v	0.8] = 1 _	15.66	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77] x] ,	0.91] X] v	104.39]]	0.4	x	0.8] =] =	42.13	$= \frac{(79)}{(79)}$
Southwest _{0.9x}	0.77] x] x	2.01	x x	104.39]]	0.4	^ x	0.8] =] =	93.06	$ = \frac{(79)}{(79)} $
Southwest _{0.9x}	0.77] ^] x	0.62] ^] x	92.85]]	0.4) ^ x	0.8]	14.35 37.48	(79)
Southwest _{0.9x}	0.77] ^] x	2.01] ^] x	92.85]]	0.4) ^ x	0.8] -] =	82.78	(79)
Southwest _{0.9x}	0.77] ^] x	0.62] ^] x	92.85]]	0.4] ^ x	0.8] -] =		(79)
Southwest _{0.9x}] ^] x	0.62] ^] x	69.27]]	0.4] ^] _X]	27.96	(79)
Southwest _{0.9x}	0.77] ^] _x	2.01] ^] x]]	0.4] ^ x	0.8] -] =	61.75	(79)
Southwest _{0.9x}	0.77] ^] x	0.62] ^] x	69.27 69.27]]	0.4	l ^	0.8] =	9.52	(79)
Southwest _{0.9x}	0.77] ^] x	0.02] ^] x	44.07]]	0.4] ^] x	0.8] =	17.79	(79)
Southwest _{0.9x}	0.77] ^] x	2.01] ^] x	44.07]]	0.4	^ x	0.8] =	39.29	(79)
Southwest _{0.9x}	0.77] ^] x	0.62] ^] x	44.07]]	0.4	l ^ l x	0.8] =	6.06	(79)
Southwest _{0.9x}	0.77]	0.02] ^] x	31.49]]	0.4	X	0.8] =	12.71	(79)
Southwest _{0.9x}	0.77] ^] x	2.01] ^] x	31.49	! 	0.4	l ^ l x	0.8] =	28.07	(79)
Southwest _{0.9x}	0.77] ^] x	0.62] ^] x	31.49	! 	0.4	l ^ l x	0.8]	4.33	(79)
Northwest 0.9x	0.77] ^] x	1.99] ^] x	11.28]]	0.4	l x	0.8] =	4.98	(81)
Northwest 0.9x	0.77]	0.9) ^] x	11.28	^ x	0.4	l ^	0.8]] =	2.25	(81)
Northwest 0.9x	0.77] ^] x	1.99] ^] x	22.97] ^] x	0.4	^ x	0.8] =	10.14	(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	1.99] ^] x	41.38] ^] _x	0.4	l ^ l x	0.8] =	18.26	(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	1.99] ^] x	67.96	^ x	0.4	l ^	0.8] =	29.99	(81)
Northwest 0.9x	0.77] ^] x	0.9] ^] x	67.96] ^ x	0.4	l ^ l x	0.8] =	13.56	(81)
5.57	0.11	J ~		J ^	L 07.00	J ^	L <u>,,,</u>	J	L 0.0	ı	10.00	

_								-						
Northwest _{0.9x}	0.77	X	1.9	99	X	9	1.35	X	0.4	x	0.8	=	40.31	(81)
Northwest 0.9x	0.77	X	0.	9	X	9	1.35	X	0.4	×	0.8	=	18.23	(81)
Northwest 0.9x	0.77	X	1.9	99	x	9	7.38	X	0.4	X	0.8	=	42.98	(81)
Northwest 0.9x	0.77	X	0.	9	x	9	7.38	X	0.4	X	0.8	=	19.44	(81)
Northwest 0.9x	0.77	X	1.9	99	X	9	91.1	X	0.4	x	0.8	=	40.2	(81)
Northwest 0.9x	0.77	X	0.	9	x	9	91.1	X	0.4	x	0.8	=	18.18	(81)
Northwest 0.9x	0.77	X	1.9	99	x	7	2.63	x	0.4	x	0.8	=	32.05	(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	1.9	99	X	5	0.42	x	0.4	x	0.8	=	22.25	(81)
Northwest 0.9x	0.77	X	0.	9	X	5	0.42	x	0.4	×	0.8	<u> </u>	10.06	(81)
Northwest 0.9x	0.77	X	1.9	99	X	2	8.07	x	0.4	x	0.8	=	12.39	(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	1.9	99	X	_	14.2	x	0.4	×	0.8	=	6.27	(81)
Northwest 0.9x	0.77	X	0.	9	X	7	14.2	x	0.4	x	0.8	=	2.83	(81)
Northwest 0.9x	0.77	x	1.9	99	X	9	9.21	x	0.4	x	0.8	=	4.07	(81)
Northwest 0.9x	0.77	x	0.	9	x	9	9.21	x	0.4	×	0.8	=	1.84	(81)
_										<u> </u>				
Solar gains in	watts, cald	culated	for eac	h month	า			(83)m	n = Sum(74)m .	(82)m				
(83)m= 97	174.54	263.55	368.04	450.09	40	63.49	439.92	376	.16 299.33	199.5	7 117.87	81.91]	(83)
Total gains – i	nternal an	d solar	(84)m =	= (73)m	+ (8	83)m	, watts		•		•		-	
(84)m= 512.84	588.36	664.33	747.74	808.42	80	01.17	764.15	706	.21 640.18	561.6	9 504.46	486.82		(84)
7. Mean inter	nal tempe	rature ((heating	seasor	n)									
7. Mean inter Temperature	•	`				area f	from Tal	ole 9	, Th1 (°C)				21	(85)
	during he	ating pe	eriods ir	n the livi	ing			ole 9	, Th1 (°C)				21	(85)
Temperature	during he	ating pe	eriods ir	n the livi	ing n (s				, Th1 (°C)	Oct	i Nov	Dec	21	(85)
Temperature Utilisation fac	during he	ating pe	eriods ir	n the livi	ing n (s	ee Ta	ble 9a)		ug Sep	Oct	t Nov 0.99	Dec 1	21	(85)
Temperature Utilisation fac Jan (86)m= 1	during he stor for gai Feb	ating pens for li Mar 0.98	eriods ir ving are Apr 0.92	n the livi ea, h1,n May	ing n (s	ee Ta Jun ^{0.58}	Jul 0.42	A 0.4	ug Sep 18 0.75				21	
Temperature Utilisation fac	during he stor for gai Feb 0.99	ating pens for li Mar 0.98	eriods ir ving are Apr 0.92	n the livi ea, h1,n May	ing n (s	ee Ta Jun ^{0.58}	Jul 0.42	A 0.4	ug Sep 18 0.75 able 9c)		0.99		21	
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02	during he stor for gai Feb 0.99 I temperat 20.18	ating pens for li Mar 0.98 ture in li 20.42	eriods ir iving are Apr 0.92 iving are 20.72	n the living the living the many 0.78 ea T1 (f	ing n (se	ee Ta Jun 0.58 w ste	Jul 0.42 ps 3 to 7	7 in T	ug Sep 18 0.75 Table 9c) 1 20.95	0.95	0.99	1	21	(86)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature	during he stor for gai Feb 0.99 I temperat 20.18	ating pens for ling Mar 0.98 ture in ling pens ating pens at the p	eriods ir iving are Apr 0.92 iving are 20.72 eriods ir	n the living the hand may 0.78 ea T1 (for 20.92 ea rest of	ing n (se	ee Ta Jun 0.58 ow ste 20.99	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta	A 0.47 in T 2 able 9	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C)	20.69	0.99	20	21	(86)
Temperature Utilisation fac Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08	during he stor for gaing Feb 0.99 I temperate 20.18 during he 20.08	ating pens for line Mar 0.98 ture in line 20.42 ating penson 20.08	Apr 0.92 iving are 20.72 eriods ir	n the living the hand may 0.78 ea T1 (for 20.92 en rest of 20.1	ing (second of the second of t	ee Ta Jun 0.58 w ste 0.99 velling	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.11	A 0.47 in T 2 able 9 20.	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C)	0.95	0.99	1	21	(86)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors	during he ctor for gaing Feb 0.99 I temperate 20.18 during he 20.08 ctor for gaing to the ctor for gaing terms and the ctor for gaing he c	ating pens for line Mar 0.98 ture in line 20.42 ating pens 20.08 ns for re	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of d	n the living the hand may not be a T1 (for 20.92 not be a T20.1 welling,	ing (second of second of s	ee Ta Jun 0.58 ow ste 20.99 velling 20.11 ,m (se	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table	A 0.47 in T 2 able 9 20.	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11	20.69	0.99	20 20.09	21	(86) (87) (88)
Temperature Utilisation fac Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08	during he stor for gai Feb 0.99 I temperat 20.18 during he 20.08	ating pens for line Mar 0.98 ture in line 20.42 ating penson 20.08	Apr 0.92 iving are 20.72 eriods ir	n the living the hand may 0.78 ea T1 (for 20.92 en rest of 20.1	ing (second of second of s	ee Ta Jun 0.58 w ste 0.99 velling	ble 9a) Jul 0.42 ps 3 to 7 21 from Ta 20.11	A 0.47 in T 2 able 9 20.	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11	20.69	0.99	20	21	(86)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna	during he tor for gaing feb 0.99 l temperate 20.18 during he 20.08 etor for gaing 1 temperate 1 temper	ating pens for line on the control of the control o	eriods in Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest	n the living the sean of the living the sean of the se	follo 2 h2,	ee Ta Jun 0.58 w ste 20.99 velling 20.11 m (se 0.5	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste	A 0.27 in T 2 able 9 20. 9a) 0.3	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11 11 20.11 11 to 7 in Table	0.95 20.69 20.1 0.93 e 9c)	20.09	20 20.09		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1	during he ctor for gaine Feb 0.99 ltemperate 20.18 during he 20.08 ctor for gaine 0.99	ating pens for line of the lin	eriods in ving are 0.92 iving are 20.72 eriods in 20.1 est of diagram 0.9	n the living the hand may not be a made of the hand may not be a made of the hand may not be a made of the hand may not be a market of the hand may not be a m	follo 2 h2,	ee Ta Jun 0.58 ow ste 20.99 velling 20.11 om (se 0.5	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34	A 0.47 in T 2 able 9 20.	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11 11 20.07	0.95 20.69 20.1 0.93 e 9c) 19.75	0.99 20.3 20.09 0.99	20 20.09 1 18.75		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna	during he tor for gaing feb 0.99 l temperate 20.18 during he 20.08 etor for gaing 1 temperate 1 temper	ating pens for line on the control of the control o	eriods in Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest	n the living the sean of the living the sean of the se	follo 2 h2,	ee Ta Jun 0.58 w ste 20.99 velling 20.11 m (se 0.5	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste	A 0.27 in T 2 able 9 20. 9a) 0.3	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11 11 20.07	0.95 20.69 20.1 0.93 e 9c) 19.75	20.09	20 20.09 1 18.75	21	(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna	during he ctor for gainer for gai	ating pens for line and line a	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest 19.77	n the living the sea Hall (for 20.92) and rest of 20.1 welling, 0.73 of dwelling 20.02	ing (see) (see	ee Ta Jun 0.58 w ste 20.99 velling 20.11 ,m (se 0.5 T2 (fo	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste 20.11	A 0.4 7 in 1 2 20. 9a) 0.3 eps 3	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11 39 0.67 1 to 7 in Table 11 20.07	0.95 20.69 20.1 0.93 e 9c) 19.75	0.99 20.3 20.09 0.99	20 20.09 1 18.75		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna (90)m= 18.78	during he stor for gainer for gai	ating pens for line and line a	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest 19.77	n the living the sea Hall (for 20.92) and rest of 20.1 welling, 0.73 of dwelling 20.02	follo follo follo follo g h2, h2, ellling	ee Ta Jun 0.58 w ste 20.99 velling 20.11 ,m (se 0.5 T2 (fo	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste 20.11	A 0.4 7 in 1 2 20. 9a) 0.3 eps 3	ug Sep 18 0.75 Table 9c) 1 20.95 19, Th2 (°C) 11 20.11 10 0.67 10 7 in Table 11 20.07 - fLA) × T2	0.95 20.69 20.1 0.93 e 9c) 19.75	0.99 20.3 20.09 0.99 0.99 19.2 ving area ÷ (4	20 20.09 1 18.75		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna (90)m= 18.78 Mean interna	during he stor for gaing feb 0.99 I temperate 20.08 stor for gaing 19 I temperate 19 I temperate 19.43	ating pens for line and line a	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest 19.77 r the whole 20.12	n the living the high may not be a function of the living	ing n (see a second content of the second c	ee Ta Jun 0.58 w ste 0.99 velling 0.11 m (se 0.5 T2 (fo 20.1 g) = fl 20.43	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste 20.11 LA × T1 20.43	A A 0.47 in 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ug Sep 18 0.75 Table 9c) 1 20.95 9, Th2 (°C) 11 20.11 39 0.67 1 to 7 in Table 11 20.07 - fLA) × T2 44 20.39	0.95 20.69 20.1 0.93 e 9c) 19.75 LA = Li	0.99 20.3 20.09 0.99 0.99 19.2 ving area ÷ (4	20 20.09 1 18.75 4) =		(86) (87) (88) (89) (90) (91)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna (90)m= 18.78 Mean interna (92)m= 19.23	during he stor for gainer for gai	ating pens for line and line a	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest 19.77 r the whole 20.12	n the living the high may not be a function of the living	ing n (second property of the second property	ee Ta Jun 0.58 w ste 0.99 velling 0.11 m (se 0.5 T2 (fo 20.1 g) = fl 20.43	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste 20.11 LA × T1 20.43	A A 0.47 in 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ug Sep 18 0.75 1 20.95 1 20.95 9, Th2 (°C) 11 20.11 11 20.07 11 20.07 12 - fLA) × T2 13 20.39 14 20.39 15 44 20.39 16 47	0.95 20.69 20.1 0.93 e 9c) 19.75 LA = Li	0.99 20.3 20.09 0.99 0.99 19.2 ving area ÷ (4	20 20.09 1 18.75 4) =		(86) (87) (88) (89) (90) (91)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna (90)m= 18.78 Mean interna (92)m= 19.23 Apply adjustn	during he stor for gaing feb 0.99 I temperate 20.08 Stor for gaing feb 19.43 I temperate 19.43 Inent to the 19.43	ating pens for line and line at line a	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of do 0.9 he rest 19.77 r the who 20.12 internal	n the living the high may not the living and the high may not the high may	ing n (second property of the second property	ee Ta Jun 0.58 w ste 20.99 velling 20.11 m (se 0.5 T2 (fo 20.1 g) = fl 20.43 ure fro	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste 20.11 LA × T1 20.43 m Table	A 0.4 7 in 1 2 able 9 20. 9a) 0.3 eps 3 20. + (1 20. 3 4e,	ug Sep 18 0.75 1 20.95 1 20.95 9, Th2 (°C) 11 20.11 11 20.07 1 to 7 in Table 11 20.07 1	0.95 20.69 20.11 0.93 e 9c) 19.75 LA = Li ^o 20.09 ppriate	0.99 20.3 20.09 0.99 0.99 19.2 ving area ÷ (4	1 20 20.09 1 18.75 4) =		(86) (87) (88) (89) (90) (91) (92)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.02 Temperature (88)m= 20.08 Utilisation factors (89)m= 1 Mean interna (90)m= 18.78 Mean interna (92)m= 19.23 Apply adjustn (93)m= 19.23	during he stor for gaing per sector for gaing per s	ating persons for line and lin	eriods in ving are Apr 0.92 iving are 20.72 eriods in 20.1 est of d 0.9 he rest 19.77 r the wh 20.12 internal 2	n the living the high may not be a, h1,n may not be a T1 (for 20.92	ing n (second property of the second property	ee Ta Jun 0.58 w ste 20.99 velling 20.11 m (se 0.5 T2 (fo 20.1 g) = fl 20.43 ure fro 20.43	Jul 0.42 ps 3 to 7 21 from Ta 20.11 ee Table 0.34 ollow ste 20.11 LA × T1 20.43 m Table 20.43	9a) 0.3 eps 3 20. + (1 20. 24e, 20.	ug Sep 18 0.75 1 20.95 1 20.95 9, Th2 (°C) 11 20.11 11 20.07 1	0.95 20.69 20.11 0.93 e 9c) 19.75 20.09 ppriate 20.09	0.99 20.3 20.09 0.99 0.99 19.2 ving area ÷ (4	1 20 20.09 1 18.75 4) =	0.37	(86) (87) (88) (89) (90) (91) (92)

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Mar

Jan

Feb

Utilisation factor for gains, hm: (94)m=	0.42 0.7	T 0.02	0.00			(94)								
(94)m= 0.99 0.99 0.97 0.9 0.75 0.53 0.37 Useful gains, hmGm , W = (94)m x (84)m	0.42 0.7	0.93	0.99	1		(94)								
	296.81 445.18	523.62	497.76	484.57		(95)								
Monthly average external temperature from Table 8	.		<u> </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 [$^{\circ}$	[(93)m- (96)m]												
	297.97 468.99	713.66	945.86	1142.18		(97)								
Space heating requirement for each month, kWh/month = 0.024	i i			400.00										
(98)m= 476.51 359.8 276.87 125.85 35.54 0 0	0 0 Total per yea	141.39	322.63	489.26	2227.04	(98)								
0	2227.84	=												
Space heating requirement in kWh/m²/year	29.09	(99)												
9b. Energy requirements – Community heating scheme														
This part is used for space heating, space cooling or water heating provided by a community scheme. Fraction of space heat from secondary/supplementary heating (Table 11) '0' if none														
Fraction of space heat from community system 1 – (301) =	abio 11) 0 ii i	10110		L T		(301)								
	lawa fan CUD ana	4- 6	- 41 v. 1 4		1	(302)								
The community scheme may obtain heat from several sources. The procedure allo includes boilers, heat pumps, geothermal and waste heat from power stations. See		up 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	ity heating sy	stem												
	1	(305)												
Distribution loss factor (Table 12c) for community heating system				[1.05	(306)								
Distribution loss factor (Table 12c) for community heating system Space heating				[(306)								
				ι []	1.05	(306)								
Space heating		304a) x (30	5) x (306) :	[- [1.05 kWh/yea	(306)								
Space heating Annual space heating requirement	(98) x (804a) x (30a	, , ,	[= [1.05 kWh/yea 2227.84	(306)								
Space heating Annual space heating requirement Space heat from Community heat pump	(98) × (3 n Table 4a or <i>i</i>	804a) x (30a	E)	[= [1.05 kWh/yea 2227.84 2339.23	(306) ar (307a)								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system)	(98) × (3 n Table 4a or <i>i</i>	304a) x (30 Appendix	E)	- [[1.05 kWh/yea 2227.84 2339.23 0	(306) ar (307a) (308								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from	(98) × (3 n Table 4a or <i>i</i>	304a) x (30 Appendix	E)	[- [[1.05 kWh/yea 2227.84 2339.23 0	(306) ar (307a) (308								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating	(98) x (3 n Table 4a or <i>i</i> m (98) x (3	304a) x (30 Appendix	E) ÷ (308) =	[]]	1.05 kWh/yea 2227.84 2339.23 0	(306) ar (307a) (308								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump	(98) x (3 n Table 4a or <i>i</i> m (98) x (3	304a) x (30a Appendix 301) x 100 ·	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89	(306) ar (307a) (308 (309)								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution	(98) x (3 n Table 4a or 7 m (98) x (3 (64) x (3	304a) x (30a Appendix 301) x 100 ·	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09	(306) ar (307a) (308 (309)								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio	(98) x (3 n Table 4a or 2 m (98) x (3 (64) x (3 0.01 x [(307a	304a) x (30a Appendix 301) x 100 ·	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09 45.27	(306) ar (307a) (308 (309) (310a) (313)								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0)	(98) x (3 n Table 4a or 2 m (98) x (3 (64) x (3 0.01 x [(307a	304a) x (30 Appendix 301) x 100 · 303a) x (30)(307e) +	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09 45.27 0	(306) ar (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	(98) x (3 n Table 4a or 2 m (98) x (3 0.01 x [(307a) = (107)	304a) x (30 Appendix 301) x 100 · 303a) x (30)(307e) +	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09 45.27 0	(306) ar (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):	(98) x (3 n Table 4a or 2 m (98) x (3 0.01 x [(307a) = (107)	304a) x (30 Appendix 301) x 100 · 303a) x (30)(307e) +	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09 45.27 0 0	(306) ar (307a) (308 (309) (310a) (313) (314) (315)								
Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our	(98) x (3 n Table 4a or 2 m (98) x (3 0.01 x [(307a) = (107)	304a) x (30 Appendix 301) x 100 · 303a) x (30)(307e) +	E) : (308) = :5) x (306) :	[[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09 45.27 0 0 200.92	(306) ar (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 outwarm air heating system fans	(98) x (3 in Table 4a or 2 in (98) x (3 in (64) x (3) 0.01 x [(307a) = (107) utside	304a) x (30 Appendix 301) x 100 · 303a) x (30)(307e) +	E) ÷ (308) = 5) x (306) = · (310a)([[=	1.05 kWh/yea 2227.84 2339.23 0 0 2083.89 2188.09 45.27 0 0 200.92 0	(306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b)								

(332)Energy for lighting (calculated in Appendix L) 334.04 Total delivered energy for all uses (307) + (309) + (310) + (312) + (315) + (331) + (332)...(237b) =5062.28 (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)613.49 0.52 Electrical energy for heat distribution [(313) x (372)0.52 23.5 Total CO2 associated with community systems (363)...(366) + (368)...(372)(373)636.99 CO2 associated with space heating (secondary) (309) x (374)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)636.99 CO2 associated with electricity for pumps and fans within dwelling (331)) x (378)0.52 104.28 CO2 associated with electricity for lighting (332))) x 0.52 (379)173.37 sum of (376)...(382) =Total CO2, kg/year (383)914.63 **Dwelling CO2 Emission Rate** $(383) \div (4) =$ (384)11.94

El rating (section 14)

(385)

89.92

		He	er Details:							
A consequently and	Day Talland	US		- N			OTDO	.000000		
Assessor Name: Software Name:	Ben Talbutt Stroma FSAP 2012)	Stroma Softwa					036639 on: 1.0.5.17		
Software Hame.	Ottoma i Orai 2012		rty Address:		31011.		VCISIO	71. 1.0.0.17		
Address :		·								
1. Overall dwelling dime	ensions:									
Ground floor		<i>,</i>	Area(m²)	(4 =)		ight(m)	7(0-)	Volume(m ³	<u>-</u>	
	\			(1a) x	2	.82	(2a) =	215.98	(3a)	
Total floor area TFA = (1	a)+(1b)+(1c)+(1d)+(1e)	+(1n)	76.59	(4)					_	
Dwelling volume				(3a)+(3b))+(3c)+(3c	d)+(3e)+	.(3n) =	215.98	(5)	
2. Ventilation rate:	main se	condary	other		total			m³ per hou	ır	
N. sala and A.P. sala a	heating he	eating		, –			40 I		_	
Number of chimneys	0 +	0 +	0] = [0		40 =	0	(6a)	
Number of open flues	0 +	0 +	0] = [0		20 =	0	(6b)	
Number of intermittent fa				L	3	X '	10 =	30	(7a)	
Number of passive vents	3			L	0	X '	10 =	0	(7b)	
Number of flueless gas f	ires				0	X 4	40 =	0	(7c)	
Air changes per hour										
Infiltration due to chimneys, flues and fans = $(6a)+(6b)+(7a)+(7b)+(7c) =$ $30 $										
	peen carried out or is intended			ontinue fr			- (0) =	0.14	(0)	
Number of storeys in t	he dwelling (ns)							0	(9)	
Additional infiltration						[(9)	-1]x0.1 =	0	(10)	
	0.25 for steel or timber from the research as the value corresponds to			•	uction			0	(11)	
deducting areas of openi		onaing to the g	reater wan are	a (aner						
If suspended wooden	floor, enter 0.2 (unseale	ed) or 0.1 (se	ealed), else	enter 0				0	(12)	
If no draught lobby, en	ter 0.05, else enter 0							0	(13)	
· ·	s and doors draught stri	ipped						0	(14)	
Window infiltration			0.25 - [0.2					0	(15)	
Infiltration rate			(8) + (10)					0	(16)	
•	q50, expressed in cubic	•	•	•	etre of e	envelope	area	5	(17)	
If based on air permeabil	es if a pressurisation test has				is heina u	sad		0.39	(18)	
Number of sides sheltere		boon done or c	a dogree dir per	modelinty	io boiling a	50 u		2	(19)	
Shelter factor			(20) = 1 -	0.075 x (1	19)] =			0.85	(20)	
Infiltration rate incorpora	ting shelter factor		(21) = (18)	x (20) =				0.33	(21)	
Infiltration rate modified f	for monthly wind speed						•			
Jan Feb	Mar Apr May	Jun Ju	ıl Aug	Sep	Oct	Nov	Dec			
Monthly average wind sp	eed from Table 7									
(22)m= 5.1 5	4.9 4.4 4.3	3.8 3.8	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 0.9	0.92	1	1.08	1.12	1.18			
					<u> </u>	Ц	l	J		

Adjusted infiltr	ation rate (allo	wing for sl	nelter ar	nd wind s	speed) =	(21a) x	(22a)m				-		
0.42 Calculate effe	0.41 0.4 Ctive air chang	0.36 Te rate for t	0.36 he appli	0.31 icable ca	0.31 ise	0.31	0.33	0.36	0.37	0.39]		
If mechanic	al ventilation:											0	(23a
If exhaust air h	eat pump using A	ppendix N, (2	(23a) = (23a	a) × Fmv (e	equation (l	N5)) , othe	rwise (23b) = (23a)				0	(23b
If balanced with	h heat recovery: e	fficiency in %	allowing	for in-use f	actor (fron	n Table 4h	ı) =					0	(230
a) If balance	ed mechanical	ventilation	with he	at recov	ery (MV	HR) (24a	a)m = (22)	2b)m + (23b) × [1 – (23c)	÷ 100]	
(24a)m= 0	0 0	0	0	0	0	0	0	0	0	0			(24a
b) If balance	ed mechanical	ventilation	without	heat red	covery (I	MV) (24k	o)m = (22	2b)m + (2	23b)	_	-		
(24b)m = 0	0 0	0	0	0	0	0	0	0	0	0]		(24b
,	nouse extract v		•	•				.5 × (23b))				
(24c)m= 0	0 0	0	0	0	0	0	0	0	0	0			(240
,	ventilation or ventilation or ventilation or ventilation or ventilation (24)							0.5]			-		
(24d)m= 0.59	0.59 0.58	0.57	0.56	0.55	0.55	0.55	0.55	0.56	0.57	0.58			(240
Effective air	change rate -	enter (24a) or (24l	b) or (24	c) or (24	d) in bo	x (25)	-	-	-	_		
(25)m= 0.59	0.59 0.58	0.57	0.56	0.55	0.55	0.55	0.55	0.56	0.57	0.58			(25)
3. Heat losse	s and heat los	s paramet	er:										
ELEMENT	Gross area (m²)	Openir m	gs	Net Ar A ,r		U-val W/m2		A X U (W/I		k-value kJ/m²-		A X	
Doors	, ,			2.52	х	1		2.52	T				(26)
Windows Type	e 1			2.45	x1	/[1/(1.4)+	0.04] =	3.25	=				(27)
Windows Type	e 2			4.58	x1	/[1/(1.4)+	0.04] =	6.07	=				(27)
Windows Type	e 3			1.68	x1	/[1/(1.4)+	0.04] =	2.23	=				(27)
Windows Type	e 4			1.68	x1	/[1/(1.4)+	0.04] =	2.23					(27)
Windows Type	e 5			0.76	x1	/[1/(1.4)+	0.04] =	1.01	一				(27)
Windows Type				0.77	= ,	/[1/(1.4)+	0.04] =	1.02	=				(27)
Windows Type	e 7			1.7	x1	/[1/(1.4)+	0.04] =	2.25	Ħ				(27)
Windows Type	e 8			0.52		/[1/(1.4)+	0.04] =	0.69	Ħ				(27)
Walls Type1	76.47	19.1	3	57.34	1 x	0.18	— _ i	10.32	Ħ r		\neg		(29)
Walls Type2	7.05	0	=	7.05	x	0.18	= :	1.27	=		=		(29)
Walls Type3	21.31	0	=	21.31	=	0.18	=	3.84	=		=		(29)
Total area of e				104.8	_	00		0.0 .					(31)
* for windows and	l roof windows, us			alue calcul		g formula 1	1/[(1/U-valu	ıe)+0.04] a	as given in	n paragrapl	h 3.2		(0.)
Fabric heat los	ss, W/K = S (A	x U)	•			(26)(30) + (32) =				3	9.97	(33)
Heat capacity	$Cm = S(A \times k)$)					((28).	(30) + (32	2) + (32a).	(32e) =		0	(34)
Thermal mass	parameter (T	MP = Cm -	: TFA) iı	n kJ/m²K			Indica	tive Value	: Medium			250	(35)
For design asses	sments where the	details of the	construct	tion are no	t known pi	ecisely the	e indicative	values of	TMP in T	able 1f			_
can be used inste			ucina A-	nnondia I	V							4.00	7,00
mermai bridg	es : S (L x Y) (aiculated	using Ap	репаіх і	T.							1.09	(36)

otal labile lie	at loss							(33) +	(36) =		L	51.06	(3
entilation hea	at loss ca	alculated	monthly	У				(38)m	= 0.33 × (25)m x (5)			
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
8)m= 41.97	41.72	41.48	40.35	40.14	39.15	39.15	38.97	39.53	40.14	40.57	41.01		(3
eat transfer o	coefficier	nt, W/K						(39)m	= (37) + (3	38)m			
9)m= 93.02	92.78	92.54	91.41	91.19	90.21	90.21	90.03	90.59	91.19	91.62	92.07		
									Average =	` '	12 /12=	91.41	(3
eat loss para	 	 							= (39)m ÷	. ,			
0)m= 1.21	1.21	1.21	1.19	1.19	1.18	1.18	1.18	1.18	1.19	1.2	1.2	1.10	ا ر
umber of day	vs in mor	nth (Tabl	le 1a)					,	Average =	Sum(40) ₁	12 /12=	1.19	(4
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1)m= 31	28	31	30	31	30	31	31	30	31	30	31		(4
,													•
1 \//oto= boo	tion on ou										kWh/ye		
1. Water hea	ung ener	igy requi	rement.								Kvvn/ye	al.	
ssumed occi											39		(4
if TFA > 13.		+ 1.76 x	[1 - exp	(-0.0003	49 x (TF	FA -13.9))2)] + 0.0	013 x (ΓFA -13.	9)			
if TFA £ 13.	•	otor ucoc	no in litro	se por de	v Vd ov	orago –	(25 v NI)	. 26					
nnual averageduce the annual									se target o		.08		(4
t more that 125	_				_	_			J				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
ot water usage i													
4)m= 100.19	96.55	92.9	89.26	85.62	81.97	81.97	85.62	89.26	92.9	96.55	100.19		
,									Γotal = Su	M(44) ₁₁₂ =	=	1092.97	(4
nergy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,n	n x nm x D	0Tm / 3600	kWh/mor	nth (see Ta	bles 1b, 1	c, 1d)		
5)m= 148.58	129.95	134.09	116.91	112.17	96.8	89.7	102.93	104.16	121.39	132.5	143.89		
								-	Γotal = Su	m(45) ₁₁₂ =	=	1433.05	(4
		na at point	of use (no	hot water	storage),	enter 0 in	boxes (46,	to (61)			_		
instantaneous v	vater heatir	.5 /											(4
	vater heatin	20.11	17.54	16.83	14.52	13.45	15.44	15.62	18.21	19.88	21.58		•
ater storage	19.49 loss:	20.11	17.54							19.88	21.58		(
s)m= 22.29 ater storage	19.49 loss:	20.11	17.54								21.58 150		
ater storage orage volum	19.49 loss: ne (litres) neating a	20.11 includin	17.54 ng any so	olar or W	/WHRS :	storage litres in	within sa	ıme ves	sel		<u> </u>		
ater storage orage volum community h	19.49 loss: ne (litres) neating a	20.11 includin	17.54 ng any so	olar or W	/WHRS :	storage litres in	within sa	ıme ves	sel		<u> </u>		
ater storage orage volum community heter storage	19.49 loss: ne (litres) neating a o stored loss:	20.11 including and no tall hot water	17.54 ag any so ank in dwar (this in	olar or W velling, e	/WHRS : nter 110 nstantan	storage litres in neous co	within sa	ıme ves	sel	47)	150		(4
ater storage orage volum community herwise if neater storage of the manufactors.	19.49 loss: ne (litres) neating a o stored l loss: turer's de	20.11 including the indicate the indicate the including th	17.54 ng any so ank in dw er (this in oss factors)	olar or W velling, e	/WHRS : nter 110 nstantan	storage litres in neous co	within sa	ıme ves	sel	47)	150		(4
ater storage orage volume community heterwise if no ater storage of the manufacter of the manufacter of the storage of the manufacter of the storage of the	19.49 noss: ne (litres) neating a o stored l loss: turer's de	20.11 including the including	17.54 ag any so nk in dw r (this in oss facto 2b	olar or W velling, e acludes i	/WHRS : nter 110 nstantan	storage litres in neous co n/day):	within sa (47) Imbi boil	ers) ente	sel	47)	150 39 54		(4
ater storage orage volum community hater storage of the storage of	19.49 ne (litres) neating a to stored l loss: turer's defactor from	20.11 including the including	17.54 ng any so ank in dwar (this in oss factor 2b , kWh/ye	olar or W velling, e ocludes in or is known	/WHRS : nter 110 nstantan wn (kWh	storage litres in neous co n/day):	within sa	ers) ente	sel	47)	150		(4
ater storage volume community hater storage of the community hater storage of the community	19.49 loss: ne (litres) neating a o stored l loss: turer's de factor froi om water turer's de	20.11 including the following the colored learned lea	17.54 ag any so ank in dwar (this in oss factor 2b , kWh/ye cylinder I	plar or W velling, e acludes in or is known ear oss facto	WHRS: nter 110 nstantan wn (kWh	storage litres in neous co n/day): known:	within sa (47) Imbi boil	ers) ente	sel	47) 1. 0. 0.	150 39 54 75		(4 (4 (5
ater storage orage volume community herwise if neater storage of the manufacter of t	19.49 ne (litres) neating a stored la loss: turer's defactor from water turer's defage loss	20.11 including the including	17.54 ag any so the index of this index of the index of	plar or W velling, e acludes in or is known ear oss facto	WHRS: nter 110 nstantan wn (kWh	storage litres in neous co n/day): known:	within sa (47) Imbi boil	ers) ente	sel	47) 1. 0. 0.	150 39 54		(4)
ater storage orage volum community herwise if neater storage of manufact amperature for lergy lost from the water storage of	19.49 ne (litres) neating a to stored l loss: turer's defactor from water turer's de age loss neating se	20.11 including and no tale hot water eclared to make eclared to factor from the eclared contact of the eclared c	17.54 ag any so the index of this index of the index of	plar or W velling, e acludes in or is known ear oss facto	WHRS: nter 110 nstantan wn (kWh	storage litres in neous co n/day): known:	within sa (47) Imbi boil	ers) ente	sel	47) 1. 0.	150 39 54 75		(4 (4 (5 (5
ater storage orage volume community hater storage of the storage o	19.49 loss: ne (litres) neating a o stored l loss: turer's de factor froi om water turer's de age loss neating se from Tak	20.11 including and no tale hot water eclared to storage eclared of factor from the eclared of	17.54 ag any so ank in dwar (this in oss factor 2b, kWh/ye bylinder I om Tablon 4.3	plar or W velling, e acludes in or is known ear oss facto	WHRS: nter 110 nstantan wn (kWh	storage litres in neous co n/day): known:	within sa (47) Imbi boil	ers) ente	sel	47) 1. 0. 0.	150 39 54 75		(4) (4) (5) (5)
	19.49 loss: ne (litres) neating a o stored l loss: turer's de factor froi turer's de age loss neating so from Tak	20.11 including and no tale hot water eclared to make eclared to factor from the eclared control from the eclared contro	ag any so ank in dw er (this in oss facto 2b , kWh/ye cylinder I om Tabl on 4.3	plar or W velling, e acludes in or is known ear oss facto e 2 (kWl	WHRS: nter 110 nstantan wn (kWh	storage litres in neous co n/day): known:	within sa (47) Imbi boil	ers) ente	sel er 'O' in (47) 1. 0. 0.	150 39 54 75 0		(44 (44 (55 (55 (55 (55 (55 (55

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

Orientation: Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast 0.9x 0.77	x	2.45	x	11.28	x	0.63	x	0.7] =	8.45	(75)
Northeast _{0.9x} 0.77	X	4.58	x	11.28	x	0.63	x	0.7	=	15.79	(75)
Northeast 0.9x 0.77	X	2.45	x	22.97	x	0.63	x	0.7	=	17.2	(75)
Northeast _{0.9x} 0.77	X	4.58	x	22.97	x	0.63	x	0.7	=	32.15	(75)
Northeast _{0.9x} 0.77	X	2.45	x	41.38	x	0.63	x	0.7	=	30.98	(75)
Northeast 0.9x 0.77	X	4.58	x	41.38	x	0.63	x	0.7	=	57.92	(75)
Northeast _{0.9x} 0.77	X	2.45	x	67.96	x	0.63	x	0.7	=	50.88	(75)
Northeast _{0.9x} 0.77	X	4.58	x	67.96	x	0.63	x	0.7	=	95.12	(75)
Northeast _{0.9x} 0.77	X	2.45	x	91.35	x	0.63	x	0.7	=	68.4	(75)
Northeast _{0.9x} 0.77	X	4.58	x	91.35	x	0.63	x	0.7	=	127.86	(75)
Northeast _{0.9x} 0.77	X	2.45	x	97.38	x	0.63	x	0.7	=	72.92	(75)
Northeast _{0.9x} 0.77	X	4.58	x	97.38	x	0.63	x	0.7	=	136.31	(75)
Northeast _{0.9x} 0.77	X	2.45	x	91.1	x	0.63	x	0.7	=	68.21	(75)
Northeast _{0.9x} 0.77	X	4.58	x	91.1	x	0.63	X	0.7	=	127.51	(75)
Northeast _{0.9x} 0.77	X	2.45	x	72.63	x	0.63	x	0.7	=	54.38	(75)
Northeast _{0.9x} 0.77	X	4.58	x	72.63	X	0.63	X	0.7	=	101.66	(75)
Northeast _{0.9x} 0.77	X	2.45	x	50.42	x	0.63	X	0.7	=	37.75	(75)
Northeast 0.9x 0.77	x	4.58	x	50.42	x	0.63	x	0.7] =	70.57	(75)
Northeast 0.9x 0.77	X	2.45	x	28.07	x	0.63	x	0.7	=	21.02	(75)
Northeast 0.9x 0.77	X	4.58	x	28.07	x	0.63	x	0.7	<u> </u>	39.29	(75)
Northeast 0.9x 0.77	X	2.45	x	14.2	x	0.63	x	0.7	=	10.63	(75)
Northeast 0.9x 0.77	X	4.58	x	14.2	x	0.63	x	0.7	=	19.87	(75)
Northeast _{0.9x} 0.77	X	2.45	x	9.21	x	0.63	X	0.7	=	6.9	(75)
Northeast _{0.9x} 0.77	X	4.58	x	9.21	X	0.63	x	0.7	=	12.9	(75)
Southeast 0.9x 0.77	X	1.68	x	36.79	X	0.63	x	0.7	=	18.89	(77)
Southeast 0.9x 0.77	X	1.68	x	62.67	x	0.63	x	0.7	=	32.18	(77)
Southeast 0.9x 0.77	X	1.68	x	85.75	x	0.63	x	0.7	=	44.03	(77)
Southeast 0.9x 0.77	X	1.68	x	106.25	x	0.63	x	0.7	=	54.55	(77)
Southeast 0.9x 0.77	X	1.68	x	119.01	x	0.63	x	0.7	=	61.1	(77)
Southeast 0.9x 0.77	X	1.68	x	118.15	x	0.63	x	0.7	=	60.66	(77)
Southeast 0.9x 0.77	X	1.68	x	113.91	x	0.63	x	0.7	=	58.48	(77)
Southeast 0.9x 0.77	X	1.68	x	104.39	x	0.63	x	0.7	=	53.6	(77)
Southeast 0.9x 0.77	X	1.68	x	92.85	x	0.63	x	0.7	=	47.67	(77)
Southeast 0.9x 0.77	X	1.68	x	69.27	x	0.63	X	0.7	=	35.56	(77)
Southeast 0.9x 0.77	X	1.68	x	44.07	x	0.63	x	0.7	=	22.63	(77)
Southeast 0.9x 0.77	x	1.68	x	31.49	x	0.63	x	0.7	j =	16.17	(77)
Southwest _{0.9x} 0.77	x	0.77	x	36.79		0.63	x	0.7	j =	17.32	(79)
Southwest _{0.9x} 0.77	x	1.7	x	36.79]	0.63	x	0.7	j =	38.23	(79)
Southwest _{0.9x} 0.77	X	0.52	X	36.79		0.63	X	0.7	=	5.85	(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	Х	62.67		0.63	X	0.7	=	65.12	(79)
Southwest _{0.9x}	0.77	X	0.52	Х	62.67		0.63	X	0.7] =	9.96	(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	85.75		0.63	X	0.7	=	89.1	(79)
Southwest _{0.9x}	0.77	X	0.52	X	85.75		0.63	X	0.7	=	13.63	(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	106.25		0.63	X	0.7	=	110.4	(79)
Southwest _{0.9x}	0.77	X	0.52	X	106.25		0.63	X	0.7	=	16.89	(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	119.01		0.63	X	0.7	=	123.66	(79)
Southwest _{0.9x}	0.77	X	0.52	X	119.01		0.63	x	0.7	=	18.91	(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	118.15		0.63	X	0.7	=	122.77	(79)
Southwest _{0.9x}	0.77	X	0.52	X	118.15		0.63	X	0.7	=	18.78	(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	113.91		0.63	x	0.7	=	118.36	(79)
Southwest _{0.9x}	0.77	X	0.52	x	113.91		0.63	x	0.7	=	18.1	(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	104.39		0.63	X	0.7	=	108.47	(79)
Southwest _{0.9x}	0.77	X	0.52	x	104.39		0.63	x	0.7	=	16.59	(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	92.85		0.63	X	0.7	=	96.48	(79)
Southwest _{0.9x}	0.77	X	0.52	x	92.85		0.63	X	0.7	=	14.76	(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	69.27		0.63	X	0.7	=	71.97	(79)
Southwest _{0.9x}	0.77	x	0.52	x	69.27		0.63	x	0.7	=	11.01	(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	х	44.07		0.63	X	0.7	=	45.79	(79)
Southwest _{0.9x}	0.77	X	0.52	х	44.07		0.63	x	0.7	=	7	(79)
Southwest _{0.9x}	0.77	x	0.77	x	31.49		0.63	x	0.7] =	14.82	(79)
Southwest _{0.9x}	0.77	x	1.7	x	31.49		0.63	x	0.7] =	32.72	(79)
Southwest _{0.9x}	0.77	x	0.52	x	31.49		0.63	x	0.7] =	5	(79)
Northwest _{0.9x}	0.77	x	1.68	x	11.28	x	0.63	x	0.7] =	5.79	(81)
Northwest _{0.9x}	0.77	х	0.76	x	11.28	x	0.63	x	0.7] =	2.62	(81)
Northwest _{0.9x}	0.77	x	1.68	x	22.97	x	0.63	x	0.7	j =	11.79	(81)
Northwest _{0.9x}	0.77	x	0.76	x	22.97	x	0.63	x	0.7	=	5.33	(81)
Northwest _{0.9x}	0.77	x	1.68	x	41.38	x	0.63	x	0.7	j =	21.25	(81)
Northwest _{0.9x}	0.77	x	0.76	x	41.38	x	0.63	x	0.7] =	9.61	(81)
Northwest _{0.9x}	0.77	x	1.68	x	67.96	x	0.63	x	0.7	=	34.89	(81)
Northwest _{0.9x}	0.77	x	0.76	x	67.96	x	0.63	x	0.7	=	15.78	(81)
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Northwest _{0.9x}	0.77	Х	1.6	88	X	9	1.35	X	0.63	X	0.7	=	46.9	(81)
Northwest 0.9x	0.77	X	0.7	' 6	X	9	1.35	X	0.63	X	0.7	=	21.22	(81)
Northwest 0.9x	0.77	X	1.6	88	X	9	7.38	x	0.63	X	0.7	=	50	(81)
Northwest 0.9x	0.77	Х	0.7	' 6	X	9	7.38	x	0.63	x	0.7	=	22.62	(81)
Northwest 0.9x	0.77	Х	1.6	88	X	9	91.1	x	0.63	x	0.7	=	46.77	(81)
Northwest 0.9x	0.77	х	0.7	76	X	9	91.1	x	0.63	x	0.7	_	21.16	(81)
Northwest 0.9x	0.77	x	1.6	88	X	7	2.63	x	0.63	x	0.7		37.29	(81)
Northwest 0.9x	0.77	X	0.7	7 6	X	7	2.63	x	0.63	x	0.7	=	16.87	(81)
Northwest 0.9x	0.77	X	1.6	88	X	5	0.42	x	0.63	x	0.7		25.89	(81)
Northwest 0.9x	0.77	x	0.7	76	X	5	0.42	x	0.63	x	0.7	=	11.71	(81)
Northwest 0.9x	0.77	X	1.6	88	X	2	8.07	x	0.63	x	0.7	=	14.41	(81)
Northwest 0.9x	0.77	х	0.7	76	X	2	8.07	x	0.63	x	0.7	=	6.52	(81)
Northwest 0.9x	0.77	X	1.6	88	X	1	14.2	x	0.63	x	0.7	=	7.29	(81)
Northwest 0.9x	0.77	X	0.7	' 6	X	1	14.2	x	0.63	x	0.7	=	3.3	(81)
Northwest 0.9x	0.77	х	1.6	88	X	9	9.21	x	0.63	x	0.7	=	4.73	(81)
Northwest 0.9x	0.77	Х	0.7	7 6	X	9	9.21	x	0.63	x	0.7	<u> </u>	2.14	(81)
_		<u></u>						•						
Solar gains in	watts ca	lculated	for eac	h month	1			(83)m	n = Sum(74)m .	(82)m				
(83)m= 112.94	203.23	306.88	428.52	524.06	$\overline{}$	39.66	512.22	437	<u> </u>	232.3		95.38]	(83)
Total gains – ir	nternal a	nd solar	(84)m =	L = (73)m	+ (83)m .	, watts	<u> </u>		<u> </u>		l	J	
(84)m= 522.47	610.73	701.32	801.9	876.06	·	71.01	830.12	761	.71 683.05	588.1	7 517.51	493.97]	(84)
7 Maga inter	a al taman												l	
			hooting	COCOC	- 1									
			(heating			aroa f	rom Tak	olo O	Th1 (°C)				24	7/95\
Temperature	during h	eating p	eriods ir	n the livi	ing			ole 9	, Th1 (°C)				21	(85)
Temperature Utilisation fac	during h	eating po	eriods ir iving are	the livi	ing n (s	ее Та	ble 9a)				1 Nov	Dee	21	(85)
Temperature Utilisation fac	during he tor for ga	eating po ains for li Mar	eriods ir iving are Apr	n the livi ea, h1,m May	ing n (s	ee Ta Jun	ble 9a) Jul	Α	ug Sep	Oc		Dec	21	
Temperature Utilisation fac	during h	eating po	eriods ir iving are	the livi	ing n (s	ee Ta	ble 9a)		ug Sep	Oc 0.96		Dec 1	21	(85)
Temperature Utilisation fac	during he tor for ga Feb 0.99	eating points for limited Mar 0.98	eriods ir iving are Apr 0.93	n the livi ea, h1,m May	ing n (s	ee Ta Jun _{0.63}	ble 9a) Jul 0.47	A 0.5	ug Sep 53 0.79	-			21	
Temperature Utilisation fac Jan (86)m= 1	during he tor for ga Feb 0.99	eating points for limited Mar 0.98	eriods ir iving are Apr 0.93	n the livi ea, h1,m May	ing n (s ollo	ee Ta Jun _{0.63}	ble 9a) Jul 0.47	A 0.5	ug Sep 53 0.79 Table 9c)	-	0.99		21	(86)
Temperature Utilisation fac Jan (86)m= 1 Mean interna	during hotel tor for garage for for garage for for garage for for garage for	eating points for line Mar 0.98 ature in l	eriods ir iving are Apr 0.93 iving are 20.56	n the livi ea, h1,m May 0.82 ea T1 (f	ing n (s ollo	ee Ta Jun 0.63 ow ste	Jul 0.47 ps 3 to 7 20.99	0.5 7 in T 20.	ug Sep 53 0.79 Table 9c) 99 20.9	0.96	0.99	1	21	(86)
Temperature Utilisation fac Jan (86)m= 1 Mean interna (87)m= 19.75	during hotel tor for garage for for garage for for garage for for garage for	eating points for line Mar 0.98 ature in l	eriods ir iving are Apr 0.93 iving are 20.56	n the livi ea, h1,m May 0.82 ea T1 (f	ollo	ee Ta Jun 0.63 ow ste	Jul 0.47 ps 3 to 7 20.99	0.5 7 in T 20.	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C)	0.96	0.99	1	21	(86)
Temperature Utilisation fac Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91	tor for ga Feb 0.99 tempera 19.92 during he	eating positions for line Mar 0.98 ature in large 20.2 eating positions 19.91	eriods ir iving are Apr 0.93 iving are 20.56 eriods ir 19.93	n the livi ea, h1,m May 0.82 ea T1 (f 20.84 n rest of	ing (s	ee Ta Jun 0.63 ow ste 20.97 velling	Jul 0.47 ps 3 to 7 20.99 from Ta	A 0.57 in T 20.	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C)	0.96	0.99	19.72	21	(86)
Temperature Utilisation fac Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature	tor for ga Feb 0.99 tempera 19.92 during he	eating positions for line Mar 0.98 ature in large 20.2 eating positions 19.91	eriods ir iving are Apr 0.93 iving are 20.56 eriods ir 19.93	n the livi ea, h1,m May 0.82 ea T1 (f 20.84 n rest of	ing (s collow) ollow dwg.	ee Ta Jun 0.63 ow ste 20.97 velling	Jul 0.47 ps 3 to 7 20.99 from Ta	A 0.57 in T 20.	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93	0.96	0.99 3 20.08 3 19.92	19.72	21	(86) (87) (88)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91 Utilisation factors (89)m= 1	tor for gate to tor for gate to to for gate to for gat	eating points for line Mar 0.98 ature in l 20.2 eating points for r 0.97	eriods ir iving are 0.93 iving are 20.56 eriods ir 19.93 est of d	n the livi ea, h1,m May 0.82 ea T1 (f 20.84 n rest of 19.93 welling, 0.76	ollo	Jun 0.63 ow ste 20.97 velling 19.94 ,m (se 0.54	Jul 0.47 ps 3 to 7 20.99 from Ta 19.94 ee Table 0.36	A 0.57 in T 20.48 ble 9 19.49 0.4	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93	0.96 20.53 19.93	0.99 3 20.08 3 19.92	19.72	21	(86) (87) (88)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91 Utilisation factors (89)m= 1 Mean interna	tor for ga Feb 0.99 tempera 19.92 during he 19.91 tor for ga 0.99	eating points for line ature in land 19.91 land 19.91 land 19.97 l	eriods in iving are 0.93 iving are 20.56 eriods in 19.93 est of do 0.91 the rest	n the living the hand the living the hand the ha	ollo h (s ollo h2 h2	ee Ta Jun 0.63 ow ste 20.97 velling 19.94 m (se 0.54	Jul 0.47 ps 3 to 7 20.99 from Ta 19.94 ee Table 0.36 collow ste	A 0.5.7 in T 20. able 9a) 0.4.9 9a) 0.4.9 9a	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93 42 0.71 4 to 7 in Tab	0.96 20.53 19.93 0.94 le 9c)	0.99 3 20.08 3 19.92 0.99	1 19.72 19.92	21	(86) (87) (88)
Temperature Utilisation fac Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91 Utilisation fac (89)m= 1	tor for gate to tor for gate to to for gate to for gat	eating points for line Mar 0.98 ature in l 20.2 eating points for r 0.97	eriods ir iving are 0.93 iving are 20.56 eriods ir 19.93 est of d	n the livies, h1,m May 0.82 ea T1 (for 20.84 n rest of 19.93 welling, 0.76	ollo h (s ollo h2 h2	Jun 0.63 ow ste 20.97 velling 19.94 ,m (se 0.54	Jul 0.47 ps 3 to 7 20.99 from Ta 19.94 ee Table 0.36	A 0.57 in T 20.48 ble 9 19.49 0.4	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93 42 0.71 5 to 7 in Tab 94 19.86	0.96 20.53 19.93 0.94 le 9c) 19.4	0.99 3 20.08 3 19.92 0.99	1 19.72 19.92 1		(86) (87) (88) (89)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91 Utilisation factors (89)m= 1 Mean interna	tor for ga Feb 0.99 tempera 19.92 during he 19.91 tor for ga 0.99	eating points for line ature in land 19.91 land 19.91 land 19.97 l	eriods in iving are 0.93 iving are 20.56 eriods in 19.93 est of do 0.91 the rest	n the living the hand the living the hand the ha	ollo h (s ollo h2 h2	ee Ta Jun 0.63 ow ste 20.97 velling 19.94 m (se 0.54	Jul 0.47 ps 3 to 7 20.99 from Ta 19.94 ee Table 0.36 collow ste	A 0.5.7 in T 20. able 9a) 0.4.9 9a) 0.4.9 9a	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93 42 0.71 5 to 7 in Tab 94 19.86	0.96 20.53 19.93 0.94 le 9c) 19.4	0.99 3 20.08 3 19.92 0.99	1 19.72 19.92 1	0.37	(86) (87) (88)
Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91 Utilisation factors (89)m= 1 Mean interna	tor for gate to see the tor fo	eating positive in the second	eriods in iving are 0.93 iving are 20.56 eriods in 19.93 est of do 0.91 the rest 19.43 r the whole who will be the wind the rest 19.43 er the whole who will be the rest 19.43 er the whole who who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the rest 19.43 er the whole who will be the whole who will be the rest 19.43 er the whole who will be the whole whole who will be the whole whole whole whole who will be the whole who will be the whole whole who will be the whole whol	n the livies, h1,m May 0.82 ea T1 (f 20.84 n rest of 19.93 welling, 0.76 of dwell 19.78	ollo dw h2	ee Ta Jun 0.63 ow ste 20.97 velling 19.94 ,m (se 0.54 T2 (fo	Jul 0.47 ps 3 to 7 20.99 from Ta 19.94 ee Table 0.36 ollow ster 19.94	A 0.5 7 in T 20. able 9 19. 0.4 eps 3 19.	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93 42 0.71 5 to 7 in Tab 94 19.86	0.96 20.53 19.93 0.94 le 9c) 19.4 fLA = Li	0.99 3 20.08 3 19.92 0.99 18.74 ving area ÷ (-	1 19.72 19.92 1 1 18.22 4) =		(86) (87) (88) (89)
Temperature Utilisation fact Jan (86)m= 1 Mean interna (87)m= 19.75 Temperature (88)m= 19.91 Utilisation fact (89)m= 1 Mean interna (90)m= 18.25	during heter for gase of temperaturing heter for gase of tempe	eating policies for line of the line of th	eriods ir iving are 0.93 iving are 20.56 eriods ir 19.93 est of de 0.91 the rest 19.43	n the livies, h1,m May 0.82 ea T1 (f 20.84 n rest of 19.93 welling, 0.76 of dwell 19.78	ing (s collaboration) (s colla	ee Ta Jun 0.63 ow ste 20.97 velling 19.94 ,m (se 0.54 T2 (fo	Jul 0.47 ps 3 to 7 20.99 from Ta 19.94 ee Table 0.36 ollow ster 19.94	A 0.5 7 in T 20. able 9 19. 0.4 eps 3 19.	ug Sep 53 0.79 Table 9c) 99 20.9 9, Th2 (°C) 94 19.93 42 0.71 5 to 7 in Tab 94 19.86 - fLA) × T2	0.96 20.53 19.93 0.94 le 9c) 19.4 fLA = Li	0.99 3 20.08 3 19.92 0.99 18.74 ving area ÷ (-	1 19.72 19.92 1		(86) (87) (88) (89) (90)
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Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Mar

Jan

Feb

Utilisa	tion fac	tor for g	ains, hm	:										
(94)m=	0.99	0.99	0.97	0.91	0.77	0.57	0.4	0.46	0.74	0.94	0.99	1	ı	(94)
Usefu	l gains,	hmGm .	, W = (9 ²	4)m x (84	4)m									
(95)m=	519.12	602.43	678.06	727.55	677.83	497.78	333.42	348.6	502.5	553	510.75	491.51	ı	(95)
г		age exte	rnal tem	perature	from Ta	able 8					·		1	
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
						i			– (96)m		1		1	
L			1192.64		771.92	514.16	335.74	352.88	555.9	840.23		1341.21		(97)
· -)m – (95				1	
(98)m=	617.31	475.92	382.85	196.39	70.01	0	0	0	0	213.7	432.43	632.18		7,000
								Tota	l per year	(kWh/year	') = Sum(9	8) _{15,912} =	3020.76	(98)
Space	heating	g require	ement in	kWh/m²	² /year								39.44	(99)
9a. Ene	ergy req	uiremer	nts – Indi	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space	e heatir	ıg:												_
Fraction	on of sp	ace hea	t from s	econdar	y/supple	mentary	system						0	(201)
Fraction	on of sp	ace hea	at from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
Fraction	on of to	tal heatii	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficie	ncy of r	nain spa	ace heat	ing syste	em 1							İ	93.5	(206)
Efficie	ncy of s	seconda	ry/supple	ementar	y heating	g system	າ, %						0	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Space	heating	g require	ement (c	alculate	d above))								
	617.31	475.92	382.85	196.39	70.01	0	0	0	0	213.7	432.43	632.18	1	
(211)m	= {[(98])m x (20	4)] } x 1	00 ÷ (20	06)									(211)
	660.22	509	409.46	210.04	74.87	0	0	0	0	228.55	462.49	676.12	1	
_								Tota	ıl (kWh/yea	ar) =Sum(2	211),15,1012	=	3230.76	(211)
Space	heating	g fuel (s	econdar	y), kWh/	month							•		_
= {[(98)	m x (20	1)]} x 1	00 ÷ (20	8)									1	
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		7
								Tota	ıl (kWh/yea	ar) =Sum(2	215) _{15,1012}	=	0	(215)
Water I	_													
Output F	from wa 195.17		ter (calc	ulated al		144.00	126.20	140.52	140.05	167.00	177.50	100.49	1	
[Efficien		172.03	180.69	162	158.77	141.89	136.29	149.52	149.25	167.98	177.59	190.48	70.0	7(246)
г		ater hea		05.00	00.0	70.0	70.0	70.0	70.0	05.40	07.4	07.77	79.8	(216)
(217)m=	87.68	87.39	86.77	85.33	82.8	79.8	79.8	79.8	79.8	85.46	87.1	87.77		(217)
		•	kWh/mo (217) ÷ (
(219)m=		196.86	208.24	189.85	191.76	177.81	170.79	187.37	187.03	196.57	203.9	217.01	1	
L						ı		Tota	I = Sum(2	19a) ₁₁₂ =			2349.79	(219)
Annual	l totals									k\	Wh/year		kWh/year	_
Space I	heating	fuel use	ed, main	system	1						-		3230.76]
Water h	neating	fuel use	d									ĺ	2349.79]
Electric	ity for p	umps, fa	ans and	electric	keep-ho	t						·		

central heating pump:			30		(230c)
boiler with a fan-assisted flue			45		(230e)
Total electricity for the above, kWh/year	sum of (230a	a)(230g) =		75	(231)
Electricity for lighting				334.34	(232)
Total delivered energy for all uses (211)(221) +	5989.9	(338)			
12a. CO2 emissions – Individual heating system	s including micro-CHP				
	Energy kWh/year	Emission fa		Emissions kg CO2/yea	r
Space heating (main system 1)	(211) x	0.216	=	697.84	(261)
Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	507.56	(264)
Space and water heating	(261) + (262) + (263) + (264) =			1205.4	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519	=	38.93	(267)
Electricity for lighting	(232) x	0.519	=	173.52	(268)
Total CO2, kg/year	sum	of (265)(271) =		1417.85	(272)
					-

TER =

(273)

27.17