Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.58 *Printed on 29 November 2022 at 15:11:43*

Proiect Information:

Assessed By: Liam Mason (STRO033679) Building Type: Semi-detached House

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 93.48m²

Site Reference: Bell Road, Bottisham

Plot Reference: Plot 3

Address: Plot 3

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.35 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 7.05 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 45.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 41.3 kWh/m²

OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.11 (max. 0.25)	0.11 (max. 0.70)	OK
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	OK
Openings	1.37 (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 5.00 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Database: (rev 508, product index 018403):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant Model: ecoFIT sustain 615

Model qualifier: VU 156/6-3 (H-GB)

(Regular)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

Regulations Compliance Report

5 Cylinder insulation			
Hot water Storage:	Measured cylinder loss: 1.	· · · · · · · · · · · · · · · · · · ·	
	Permitted by DBSCG: 2.30) kWh/day	OK
Primary pipework insulated:	Yes		OK
6 Controls			
Space heating controls	TTZC by plumbing and ele	ectrical services	oĸ
Hot water controls:	Cylinderstat		OK
	Independent timer for DHV	V	OK
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Not applicable			
9 Summertime temperature			
Overheating risk (East Anglia):		Slight	OK
Based on:		Slight	OK
Overshading:		Average or unknown	
Windows facing: South		1.35m ²	
Windows facing: North		0.86m²	
Windows facing: North		1.48m²	
Windows facing: North		1.4m²	
Windows facing: South		3.33m²	
Windows facing: South		0.99m²	
Windows facing: West		0.5m²	
Windows facing: West		0.5m²	
Windows facing: South		1.46m²	
Ventilation rate:		4.00	
Blinds/curtains:		Dark-coloured curtain or roller blind	
		Closed 100% of daylight hours	
10 Key features			
Roofs U-value		0.11 W/m²K	
Party Walls U-value		0 W/m ² K	
Floors U-value		0.11 W/m²K	
Photovoltaic array			

Predicted Energy Assessment



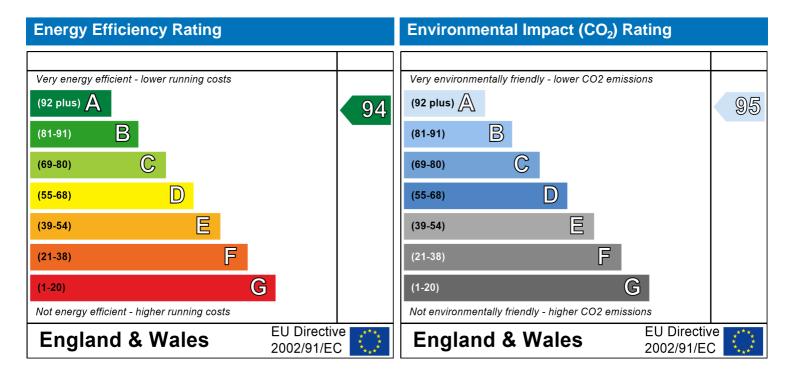
Plot 3

of the completed property.

Dwelling type: Date of assessment: Produced by: Total floor area: Semi-detached House 03 November 2022 Liam Mason 93.48 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

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

Address: Plot 3 Located in: England Region: East Anglia

UPRN:

03 November 2022 Date of assessment: 29 November 2022 Date of certificate: New dwelling design stage Assessment type:

New dwelling Transaction type: Tenure type: Unknown Related party disclosure: No related party Thermal Mass Parameter: Indicative Value Low

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

508 PCDF Version:

Dwelling type: House

Semi-detached Detachment:

2022 Year Completed:

Floor Location: Floor area:

46.74 m² 2.4 m Floor 0 Floor 1 46.74 m² 2.4 m

Wall 1

16.24 m² (fraction 0.174) Living area:

Front of dwelling faces: North

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W_100

Name:	Source:	Туре:	Glazing:		Argon:	Frame:
D_12	Manufacturer	Solid				
W_97	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_98	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_99	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_100	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_101	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_102	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_103	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_104	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
W_105	Manufacturer	Windows	low-E, En =	0.05, soft coat	Yes	
Name:	Gap:	Frame Fac	ctor: g-value:	U-value:	Area:	No. of Openings:
D_12	mm	0	0	1.2	2.03	1
W_97	16mm or more	0.7	0.63	1.4	1.35	1
W_98	16mm or more	0.7	0.63	1.4	0.86	1
W_99	16mm or more	0.7	0.63	1.4	1.48	1
W_100	16mm or more	0.7	0.63	1.4	1.4	1
W_101	16mm or more	0.7	0.63	1.4	3.33	1
W_102	16mm or more	0.7	0.63	1.4	0.99	1
W_103	16mm or more	0.7	0.63	1.4	0.5	1
W_104	16mm or more	0.7	0.63	1.4	0.5	1
W_105	16mm or more	0.7	0.63	1.4	1.46	1
Name:	Type-Name:	Location:	Orient:		Width:	Height:
D_12	Doors	Wall 1	North		2.03	1
W_97	Windows	Wall 1	South		1.35	1
W_98	Windows	Wall 1	North		0.86	1
W_99	Windows	Wall 1	North		1.48	1

North

Storey height:

Windows

1

1.4

SAP Input

W 101	Windows	Wall 1	South	3.33	1
W_102	Windows	Wall 1	South	0.99	1
W_103	Windows	Wall 1	West	0.5	1
W_104	Windows	Wall 1	West	0.5	1
W_105	Windows	Wall 1	South	1.46	1

Overshading: Average or unknown

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Карра:
External Elemen	<u>its</u>						
Wall 1	99.4	13.9	85.5	0.19	0	False	N/A
Roof 1	46.74	0	46.74	0.11	0		N/A
Floor 1	46.74			0.11			N/A
Internal Elemen	ts						
INT FLOOR	<u>46.74</u>						N/A
Party Elements							
Party Wall	43.5						N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.0744

Length	Psi-value		
10.51	0.3	E2	Other lintels (including other steel lintels)
7.89	0.04	E3	Sill
25.3	0.05	E4	Jamb
19.49	0.16	E5	Ground floor (normal)
19.49	0.07	E6	Intermediate floor within a dwelling
10.96	0.06	E10	Eaves (insulation at ceiling level)
10.43	0.24	E12	Gable (insulation at ceiling level)
10.2	0.09	E16	Corner (normal)
10.2	0.06	E18	Party wall between dwellings
0	0.3	E2	
0	0.04	E3	
0	0.05	E4	
0	0.16	E5	
0	0.07	E6	
0	0.06	E10	
0	0.24	E12	
0	0.09	E16	
0	-0.09	E17	
0	0.06	E18	
8.53	0	P2	Intermediate floor within a dwelling
0	0.16	P1	Ground floor
0	0.16	P1	
0	0	P2	
5.48	0.08	R4	Ridge (vaulted ceiling)
0	0.08	R4	

Ventilation:

Pressure test: Yes (As designed)

Ventilation: Natural ventilation (extract fans)

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

SAP Input

Pressure test: 5

Main heating system:

Main heating system: Boiler systems with radiators or underfloor heating

Gas boilers and oil boilers

Fuel: mains gas

Info Source: Boiler Database

Database: (rev 508, product index 018403) Efficiency: Winter 80.1 % Summer: 90.8

Brand name: Vaillant Model: ecoFIT sustain 615

Model qualifier: VU 156/6-3 (H-GB)

(Regular boiler)
Systems with radiators

Central heating pump: 2013 or later

Design flow temperature: Design flow temperature<=45°C

Unknown

Boiler interlock: Yes Delayed start

Main heating Control:

Main heating Control: Time and temperature zone control by suitable arrangement of plumbing and electrical

services

Control code: 2110

Secondary heating system:

Secondary heating system: None

Water heating

Water heating: From main heating system

Water code: 901 Fuel :mains gas Hot water cylinder Cylinder volume: 210 litres

Cylinder insulation: Measured loss, 1.32kWh/day

Primary pipework insulation: True

Cylinderstat: True

Cylinder in heated space: True

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: Photovoltaic 1

Installed Peak power: 2 Tilt of collector: 45°

Overshading: None or very little Collector Orientation: South

Assess Zero Carbon Home: No

			User D	etails:							
Assessor Name:	Liam Mason			Strom	a Num	ber:		STRO	033679		
Software Name:	Stroma FSAP	2012		Softwa	are Ve	rsion:		Versio	n: 1.0.5.58		
		Pi	operty.	Address	: Plot 3						
Address :	Plot 3										
Overall dwelling dime	nsions:			4 0							
Ground floor				a(m²) 16.74	(1a) x	Av. Hei	ght(m) .4	(2a) =	Volume(m³)) (3a)	
First floor				16.74](1b) x		.4](2b) =	112.18	(3b)	
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)	+(1e)+(1n		93.48](4)				112.10	(/	
Dwelling volume	, (-, (-, (-,	(-) (′		J)+(3c)+(3d)+(3e)+	(3n) =	004.05	7(5)	
					(00) (00)	, , (00) ,	(011) –	224.35	(5)	
2. Ventilation rate:	main	secondar	V	other		total			m³ per houi	r	
Number of chimneys	heating	heating	,] + [7 = F		x	40 =	-	(6a)	
Number of open flues]	0	」	0		20 =	0	$\int_{(6b)}^{(6a)}$	
Number of intermittent far	0	0] . [0		0		10 =	0	(6b) (7a)	
Number of passive vents	13				L	2		10 =	20	╡``	
·	200				L	0		40 =	0	(7b)	
Number of flueless gas fir	es					0	^	40 -	0	(7c)	
								Air ch	anges per ho	ur	
Infiltration due to chimney	s, flues and fans	= (6a)+(6b)+(7a)	a)+(7b)+(7c) =	Γ	20		÷ (5) =	0.09	(8)	
If a pressurisation test has be	·				continue fr	-		、 /	0.00	``	
Number of storeys in th	e dwelling (ns)								0	(9)	
Additional infiltration							[(9))-1]x0.1 =	0	(10)	
Structural infiltration: 0.					•	ruction			0	(11)	
if both types of wall are pro deducting areas of openin			the great	ter wall are	ea (after						
If suspended wooden fl			1 (seale	ed), else	enter 0				0	(12)	
If no draught lobby, ent	er 0.05, else ente	r O							0	(13)	
Percentage of windows	and doors draug	ht stripped							0	(14)	
Window infiltration				0.25 - [0.2	2 x (14) ÷ 1	100] =			0	(15)	
Infiltration rate				(8) + (10)	+ (11) + (1	12) + (13) +	- (15) =		0	(16)	
Air permeability value,	q50, expressed in	cubic metre	s per ho	our per s	quare m	etre of e	nvelope	area	5	(17)	
If based on air permeabili	ty value, then (18)	$= [(17) \div 20] + (8)$), otherw	ise (18) =	(16)				0.34	(18)	
Air permeability value applies	s if a pressurisation te	st has been don	e or a de	gree air pe	ermeability	is being us	sed				
Number of sides sheltered	d			(22)		. = \ 7			2	(19)	
Shelter factor					[0.075 x (′	19)] =			0.85	(20)	
Infiltration rate incorporati				(21) = (18	3) x (20) =				0.29	(21)	
Infiltration rate modified for	or monthly wind co	2004									
	i inonuny wind sp					_			I		
		May Jun	Jul	Aug	Sep	Oct	Nov	Dec			

4.9

4.4

4.3

3.8

3.8

3.7

4

4.3

4.5

4.7

(22)m=

Wind F	actor (2	22a)m =	(22)m ÷	4										
(22a)m=	1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18		
Adjuste	ed infiltra	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	: (21a) x	(22a)m					
_ [0.37	0.36	0.35	0.32	0.31	0.27	0.27	0.27	0.29	0.31	0.32	0.34		
		<i>ctive air e</i> al ventila	•	rate for t	he appli	cable ca	se						0	(23a)
				endix N, (2	(3b) = (23a	a) × Fmv (e	equation (I	N5)) , othe	rwise (23b) = (23a)			0	(23b)
If bala	nced with	n heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (fron	n Table 4h) =				0	(23c)
a) If I	balance	ed mecha	anical ve	entilation	with he	at recov	ery (MVI	HR) (24a	a)m = (2)	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 mecha	anical ve	entilation	without	heat red	covery (I	MV) (24b	o)m = (22	2b)m + (2	23b)		-	
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24b)
,				ntilation o	•	•								
r	` ,		<u> </u>	· ` `	ŕ	ŕ	· ` `		ŕ	.5 × (23b			1	(0.4-)
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24c)
				ole hous $m = (221)$						0.51				
(24d)m=		0.56	0.56	0.55	0.55	0.54	0.54	0.54	0.54	0.55	0.55	0.56		(24d)
Effec	ctive air	change	rate - er	nter (24a) or (24k	o) or (24	c) or (24	ld) in bo	x (25)				•	
(25)m=	0.57	0.56	0.56	0.55	0.55	0.54	0.54	0.54	0.54	0.55	0.55	0.56		(25)
2 40														
э. пеа	at losse:	s and he	eat loss	paramet	er:									
ELEN		s and he Gros area	SS	parameto Openin m	gs	Net Ar A ,r		U-val W/m2		A X U (W/I	<)	k-value kJ/m²-l		A X k kJ/K
		Gros	SS	Openin	gs		m²				<) 			
ELEN Doors		Gros area	SS	Openin	gs	A ,r	m² x	W/m2	2K =	(W/I	<) 			kJ/K
ELEM Doors Window	IENT	Gros area	SS	Openin	gs	A ,r	m ² x x1	W/m2	2K = - 0.04] =	(W/I 2.436	<) 			kJ/K (26)
Doors Window Window	IENT ws Type	Gros area e 1	SS	Openin	gs	A ,r 2.03	m² x x1 x1	W/m2 1.2 /[1/(1.4)+	2K = 0.04] = 0.04] =	(W/I 2.436 1.79	<) 			kJ/K (26) (27)
Doors Window Window Window	IENT ws Type ws Type	Gros area e 1 e 2 e 3	SS	Openin	gs	A ,r 2.03 1.35	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+	EK = 0.04] = 0.04] = 0.04] = 0.04] =	(W/I 2.436 1.79 1.14	<)			kJ/K (26) (27) (27)
Doors Window Window Window Window	IENT ws Type ws Type ws Type	Gros area 1 2 2 3 4 4	SS	Openin	gs	A ,r 2.03 1.35 0.86 1.48	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	eK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/I 2.436 1.79 1.14 1.96	<) 			kJ/K (26) (27) (27) (27)
Doors Window Window Window Window Window	NS Type NS Type NS Type NS Type	Gros area 1 2 2 3 3 4 4 5 5	SS	Openin	gs	A ,r 2.03 1.35 0.86 1.48	m ²	W/m ² 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	EK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/I 2.436 1.79 1.14 1.96 1.86	<)			kJ/K (26) (27) (27) (27) (27)
Doors Window Window Window Window Window Window	WS Type WS Type WS Type WS Type WS Type	Gros area 1 2 3 4 4 5 6 6	SS	Openin	gs	A ,r 2.03 1.35 0.86 1.48 1.4 3.33	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	EK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0	(W/I 2.436 1.79 1.14 1.96 1.86 4.41	<)			kJ/K (26) (27) (27) (27) (27) (27)
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Doors Window	WS Type	Gros area 1 1 2 2 3 4 4 5 5 6 6 7 8 8	ss (m²)	Openin	gs ₁ ²	A ,r 2.03 1.35 0.86 1.48 1.4 3.33 0.99 0.5 1.46	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	EK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0	(W/I 2.436 1.79 1.14 1.96 1.86 4.41 1.31 0.66 0.66 1.94				kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27
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Doors Window Roof	WS Type	Gros area 4 1 4 2 4 3 4 4 5 5 6 6 7 7 8 8 9 9	ss (m²)	Openin m	gs ₁ ²	A ,r 2.03 1.35 0.86 1.48 1.4 3.33 0.99 0.5 1.46 46.74 85.5	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.11 0.19	EK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0	(W/I 2.436 1.79 1.14 1.96 1.86 4.41 1.31 0.66 0.66 1.94 5.1414 16.25				kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27
Doors Window Roof	WS Type	Gros area 1 1 2 2 3 3 4 4 4 5 5 6 6 7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	ss (m²)	Openin m	gs ₁ ²	A ,r 2.03 1.35 0.86 1.48 1.4 3.33 0.99 0.5 1.46 46.74 85.5	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.11 0.19	EK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0	(W/I 2.436 1.79 1.14 1.96 1.86 4.41 1.31 0.66 0.66 1.94 5.1414 16.25				kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27
Doors Window Roor Walls Roof Total a	WS Type	Gros area 1 1 2 2 3 3 4 4 4 5 5 6 6 7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	ss (m²)	Openin m	gs ₁ ²	A ,r 2.03 1.35 0.86 1.48 1.4 3.33 0.99 0.5 0.5 46.74 85.5 46.74	m ²	W/m2 1.2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.11 0.19 0.11	EK = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0	(W/I 2.436 1.79 1.14 1.96 1.86 4.41 1.31 0.66 0.66 1.94 5.1414 16.25 5.14				kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27

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

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

44.7

(33)

Heat capacity Cr	$m = S(A \times k)$)					((28)	.(30) + (32	2) + (32a).	(32e) =	20098.38	(34)
Thermal mass p	,		÷ TFA) ir	n kJ/m²K			Indica	tive Value	: Low		100	(35)
For design assessm	nents where the	details of the	,			ecisely the	e indicative	values of	TMP in Ta	able 1f	100	(/
Thermal bridges	s : S (L x Y)	calculated	using Ap	pendix l	K						14.35	(36)
if details of thermal back. Total fabric heat		t known (36)	= 0.05 x (3	11)			(33) +	(36) =			59.05	(37)
Ventilation heat	loss calcula	ted monthl	V				(38)m	= 0.33 × (25)m x (5)			`
Jan	Feb Ma		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 42.02	41.82 41.6		40.57	39.79	39.79	39.65	40.09	40.57	40.91	41.27		(38)
Heat transfer co	efficient, W/	K	•	•	•	•	(39)m	= (37) + (37)	38)m		'	
(39)m= 101.06 1	100.87 100.6	88 99.79	99.62	98.84	98.84	98.7	99.14	99.62	99.96	100.31		
Heat loss param	neter (HLP),	W/m²K			-			Average = = (39)m ÷	Sum(39) ₁ .	12 /12=	99.79	(39)
(40)m= 1.08	1.08 1.08	3 1.07	1.07	1.06	1.06	1.06	1.06	1.07	1.07	1.07		_
Number of days	in month (T	able 1a)					,	Average =	Sum(40) _{1.}	12 /12=	1.07	(40)
Jan	Feb Ma	ır Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m= 31	28 31	30	31	30	31	31	30	31	30	31		(41)
4. Water heatin	ng energy re	quirement:								kWh/ye	ear:	
Assumed occupa	ancv. N										İ	
if TFA > 13.9, if TFA £ 13.9,	N = 1 + 1.70	6 x [1 - exp	0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.		67		(42)
·	N = 1 + 1.70 N = 1 hot water us	sage in litre	` es per da	ay Vd,av	erage =	(25 x N)	+ 36		9)	67		(42)
if TFA £ 13.9, Annual average	N = 1 + 1.70 N = 1 hot water us average hot wa	sage in litre ter usage by	es per da 5% if the d	ay Vd,av Iwelling is	erage = designed	(25 x N)	+ 36		9)			, ,
if TFA £ 13.9, Annual average Reduce the annual a	N = 1 + 1.70 N = 1 hot water us average hot wa	sage in litro ter usage by per day (all v	es per da 5% if the d	ay Vd,av Iwelling is	erage = designed	(25 x N)	+ 36		9)			, ,
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti	N = 1 + 1.70 N = 1 hot water us average hot waters per person Feb Ma	sage in litro ter usage by per day (all v	es per da 5% if the d vater use, l	ay Vd,av dwelling is hot and co	erage = designed i	(25 x N) to achieve	+ 36 a water us	se target o	9) 97	7.62		, ,
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li	N = 1 + 1.70 N = 1 hot water us average hot waters per person Feb Ma	sage in litre ter usage by per day (all v ar Apr r each month	es per da 5% if the d vater use, l	ay Vd,av dwelling is hot and co	erage = designed i	(25 x N) to achieve	+ 36 a water us	se target o	9) 97	7.62		, ,
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li	N = 1 + 1.70 $N = 1$ hot water us average hot waters per person Feb Malitres per day for 103.48 99.5	sage in litro ter usage by per day (all v ar Apr r each month	es per da 5% if the d vater use, I May Vd,m = fa 91.77	ay Vd,av fwelling is that and co Jun ctor from	erage = designed in the state of the state o	(25 x N) to achieve Aug (43) 91.77	+ 36 a water us Sep 95.67	Oct 99.57 Total = Su	9) Nov 103.48 m(44) ₁₁₂ =	Dec 107.38	1171.47	, ,
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 litt Jan Hot water usage in li (44)m= 107.38 1	N = 1 + 1.70 $N = 1$ hot water us average hot waters per person Feb Malitres per day for 103.48 99.5	sage in litro ter usage by per day (all v ar Apr r each month 7 95.67 calculated m	es per da 5% if the d vater use, I May Vd,m = fa 91.77	ay Vd,av fwelling is that and co Jun ctor from	erage = designed in the state of the state o	(25 x N) to achieve Aug (43) 91.77	+ 36 a water us Sep 95.67	Oct 99.57 Total = Su	9) Nov 103.48 m(44) ₁₁₂ =	Dec 107.38	1171.47	(43)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li (44)m= 107.38 1 Energy content of ho (45)m= 159.25 1	N = 1 + 1.70 N = 1 hot water us average hot wateres per person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7	sage in litre ter usage by per day (all v ar Apr r each month 7 95.67 calculated m 72 125.3	es per da 5% if the ovater use, I May Vd, $m = fa$ 91.77 onthly = 4.	ay Vd,av Iwelling is that and co Jun ctor from 87.86 190 x Vd,r	erage = designed and designed a	(25 x N) to achieve Aug (43) 91.77 9Tm / 3600 110.32	+ 36 a water us Sep 95.67 0 kWh/mon 111.64	Oct 99.57 Total = Su 130.1	9) Nov 103.48 m(44)12 = ables 1b, 1	.62 Dec 107.38 c, 1d) 154.22	1171.47	(43)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li (44)m= 107.38 1 Energy content of ho (45)m= 159.25 1	N = 1 + 1.70 N = 1 hot water us average hot waters per person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at person	sage in litre ter usage by per day (all var Aprar each month) 7 95.67 calculated m 72 125.3	es per da 5% if the ovater use, I May Vd,m = fa 91.77 onthly = 4. 120.23	ay Vd,av Iwelling is that and co Jun ctor from 87.86 190 x Vd,r 103.75	erage = designed in	(25 x N) to achieve Aug (43) 91.77 97m / 3600 110.32 boxes (46)	+ 36 a water us Sep 95.67 0 kWh/mon 111.64	Oct 99.57 Total = Sunth (see Tail 130.1) Total = Sunth (see Tail 130.1)	9) 97 Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02 m(45) ₁₁₂ =	.62 Dec 107.38		(43) (44) (45)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li (44)m= 107.38 1 Energy content of hot (45)m= 159.25 1 If instantaneous wate (46)m= 23.89	N = 1 + 1.70 N = 1 hot water usaverage hot wateres per person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at person 20.89 21.5	sage in litre ter usage by per day (all var Aprar each month) 7 95.67 calculated m 72 125.3	es per da 5% if the ovater use, I May Vd, $m = fa$ 91.77 onthly = 4.	ay Vd,av Iwelling is that and co Jun ctor from 87.86 190 x Vd,r	erage = designed and designed a	(25 x N) to achieve Aug (43) 91.77 9Tm / 3600 110.32	+ 36 a water us Sep 95.67 0 kWh/mon 111.64	Oct 99.57 Total = Su 130.1	9) 97 Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02	.62 Dec 107.38 c, 1d) 154.22		(43)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li (44)m= 107.38 1 Energy content of ho (45)m= 159.25 1	N = 1 + 1.70 N = 1 hot water us average hot water sper person Feb Ma ditres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at person 20.89 21.5 OSS:	sage in litre ter usage by per day (all var Apr reach month) 7 95.67 calculated m 72 125.3 pint of use (not be appeared)	es per da 5% if the ovater use, I May Vd,m = fa 91.77 onthly = 4. 120.23 o hot water 18.03	ay Vd,av Iwelling is hot and co Jun ctor from 87.86 190 x Vd,r 103.75 r storage),	erage = designed in designed i	(25 x N) to achieve Aug (43) 91.77 07m / 3600 110.32 boxes (46) 16.55	+ 36 a water us Sep 95.67 0 kWh/more 111.64 16.75	Oct 99.57 Fotal = Su 130.1 Fotal = Su 19.52	9) Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02 m(45) ₁₁₂ = 21.3	.62 Dec 107.38		(43) (44) (45)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li (44)m= 107.38 1 Energy content of hot (45)m= 159.25 1 If instantaneous wate (46)m= 23.89 Water storage lo Storage volume If community hea Otherwise if no s	N = 1 + 1.70 N = 1 hot water use average hot water es per person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at per 20.89 21.5 oss: (litres) inclurating and no stored hot water used hot water estimates and no stored hot water estimates and no	sage in litre ter usage by per day (all var Apr reach month) 7 95.67 calculated may 125.3 pint of use (not 18.8) ding any series tank in dy	es per da 5% if the ovater use, I May Vd,m = fa 91.77 onthly = 4. 120.23 o hot water 18.03 olar or W velling, e	ay Vd,av Iwelling is hot and co Jun ctor from 87.86 190 x Vd,r 103.75 r storage), 15.56 /WHRS	erage = designed in designed i	(25 x N) to achieve Aug (43) 91.77 07m / 3600 110.32 boxes (46) 16.55 within sa (47)	+ 36 a water us Sep 95.67 0 kWh/more 111.64 16.75 ame vess	99.57 Total = Sunth (see Tail 130.1 Total = Sunth (see Tail 130.1) Total = Sunth (see Tail 130.1)	9) Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02 m(45) ₁₁₂ = 21.3	.62 Dec 107.38		(43) (44) (45) (46)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 litt Jan Hot water usage in lit (44)m= 107.38 1 Energy content of hot (45)m= 159.25 1 If instantaneous wate (46)m= 23.89 Water storage loss torage volume If community hear	N = 1 + 1.70 N = 1 hot water us average hot water sper person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at person 20.89 21.5 OSS: (litres) inclurating and no stored hot wooss:	sage in litro ter usage by per day (all v ar Apr r each month 7 95.67 calculated m 72 125.3 pint of use (n 6 18.8 ding any s o tank in dv ater (this in	es per da 5% if the o vater use, I May Vd,m = fa 91.77 onthly = 4. 120.23 o hot water 18.03 olar or W velling, e ncludes i	ay Vd,av Iwelling is hot and co Jun ctor from 87.86 190 x Vd,i 103.75 storage), 15.56 /WHRS inter 110 instantar	erage = designed in designed i	(25 x N) to achieve Aug (43) 91.77 07m / 3600 110.32 boxes (46) 16.55 within sa (47)	+ 36 a water us Sep 95.67 0 kWh/more 111.64 16.75 ame vess	99.57 Total = Sunth (see Tail 130.1 Total = Sunth (see Tail 130.1) Total = Sunth (see Tail 130.1)	9) Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02 m(45) ₁₁₂ = 21.3	.62 Dec 107.38		(43) (44) (45) (46)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 litt Jan Hot water usage in li (44)m= 107.38 1 Energy content of ho (45)m= 159.25 1 If instantaneous wate (46)m= 23.89 Water storage lo Storage volume If community hea Otherwise if no s Water storage lo	N = 1 + 1.70 N = 1 hot water us average hot water sper person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at person 20.89 21.5 oss: (litres) inclurating and no stored hot wors: rer's declare	sage in litre ter usage by per day (all var Apr reach month) 7 95.67 calculated may 125.3 pint of use (not) 6 18.8 ding any say tank in dwater (this in decorption)	es per da 5% if the o vater use, I May Vd,m = fa 91.77 onthly = 4. 120.23 o hot water 18.03 olar or W velling, e ncludes i	ay Vd,av Iwelling is hot and co Jun ctor from 87.86 190 x Vd,i 103.75 storage), 15.56 /WHRS inter 110 instantar	erage = designed in designed i	(25 x N) to achieve Aug (43) 91.77 07m / 3600 110.32 boxes (46) 16.55 within sa (47)	+ 36 a water us Sep 95.67 0 kWh/more 111.64 16.75 ame vess	99.57 Total = Sunth (see Tail 130.1 Total = Sunth (see Tail 130.1) Total = Sunth (see Tail 130.1)	9) Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02 m(45) ₁₁₂ = 21.3	Dec 107.38 c, 1d) 154.22 23.13		(43) (44) (45) (46) (47)
if TFA £ 13.9, Annual average Reduce the annual a not more that 125 liti Jan Hot water usage in li (44)m= 107.38 1 Energy content of ho (45)m= 159.25 1 If instantaneous wate (46)m= 23.89 Water storage lo Storage volume If community hea Otherwise if no s Water storage lo a) If manufactur	N = 1 + 1.76 N = 1 hot water use average hot water sper person Feb Ma litres per day for 103.48 99.5 ot water used - 139.28 143.7 ter heating at person 20.89 21.5 oss: (litres) inclurating and no stored hot work oss: rer's declared to rector from Talen water stora	sage in litre ter usage by per day (all var Apr reach month) 7 95.67 calculated may 125.3 pint of use (not 18.8) ding any sate tank in dwater (this in dwater (this in decay) ge, kWh/y	es per da 5% if the ovater use, I May Vd,m = fa 91.77 onthly = 4. 120.23 o hot water 18.03 olar or Water velling, encludes i or is known	ay Vd,av Iwelling is hot and co Jun ctor from 87.86 190 x Vd,r 103.75 r storage), 15.56 IWHRS enter 110 nstantar wn (kWh	erage = designed in designed i	(25 x N) to achieve Aug (43) 91.77 07m / 3600 110.32 boxes (46) 16.55 within sa (47)	+ 36 a water us Sep 95.67 0 kWh/mor 111.64 16.75 ame vess ers) ente	99.57 Total = Sunth (see Tail 130.1 Total = Sunth (see Tail 130.1) Total = Sunth (see Tail 130.1)	9) Nov 103.48 m(44) ₁₁₂ = ables 1b, 1 142.02 m(45) ₁₁₂ = 21.3 47)	.62 Dec 107.38 c, 1d) 154.22 23.13 210		(43) (44) (45) (46) (47)

Hot water storage loss factor	r from Table	e 2 (kWh/lit	tre/da	y)					0		(51)
If community heating see se										•	
Volume factor from Table 2								-	0		(52)
Temperature factor from Ta									0		(53)
Energy lost from water stora	ige, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(54)
Enter (50) or (54) in (55)								0.	71		(55)
Water storage loss calculate	ed for each i	month			((56)m = (55) × (41)r	m				
(56)m= 22.1 19.96 22.1	1 21.38	22.1 2	21.38	22.1	22.1	21.38	22.1	21.38	22.1		(56)
If cylinder contains dedicated solar	storage, (57)n	n = (56)m x [((50) – (l	H11)] ÷ (50	0), else (57	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m= 22.1 19.96 22.	21.38	22.1 2	21.38	22.1	22.1	21.38	22.1	21.38	22.1		(57)
Primary circuit loss (annual)	from Table	3							0		(58)
Primary circuit loss calculate)m = (58) ÷ 36	5 × (41)	m				•	
(modified by factor from T	able H5 if th	nere is sola	ar wat	er heatir	ng and a	cylinde	r thermo	stat)			
(59)m= 43.31 39.12 43.3	1 41.92	43.31 4	11.92	43.31	43.31	41.92	43.31	41.92	43.31		(59)
Combi loss calculated for ea	ach month (61)m = (60	0) ÷ 36	65 × (41)	m					•	
(61)m= 0 0 0	0	0	0	0	0	0	0	0	0		(61)
Total heat required for wate	r heating ca	lculated fo	ır each	month	(62)m –	0.85 🗸 (45)m ±	(46)m ±	(57)m ±	l (59)m + (61)m	
(62)m= 224.66 198.36 209.			67.05	161.55	175.73	174.94	195.51	205.32	219.63	(33)111 1 (31)111 	(62)
Solar DHW input calculated using A											(02)
(add additional lines if FGHI			-				CONTINUE	on to wate	i nealing)		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0	0	0	0	0	0	0	0	0		(63)
Output from water heater					ŭ		Ü		Ů		()
Output from water fleater											
(64)m= 224.66 198.36 209	13 1886	185.64 16	67.05	161 55	175 73	17/1 0/	105 51	205 32	210.63		
(64)m= 224.66 198.36 209.	13 188.6	185.64 16	67.05	161.55	175.73	174.94	195.51	205.32	219.63	2306.13	7(64)
` '	l l	I			Outp	out from wa	ater heate	r (annual) _{1.}	12	2306.13	(64)
Heat gains from water heati	ng, kWh/ma	onth 0.25 ′	[0.85	× (45)m	Outp + (61)m	out from wa	ater heater	r (annual) ₁ . + (57)m	+ (59)m		J
Heat gains from water heati (65)m= 105.28 93.57 100.	ng, kWh/mo	onth 0.25 ´	[0.85	× (45)m 84.29	Outp + (61)m 89.01	out from wa n] + 0.8 x 87.76	ater heater ([(46)m 95.59	(annual) ₁ .+ (57)m	+ (59)m]	(64) (65)
Heat gains from water heati	ng, kWh/mo	onth 0.25 ´	[0.85	× (45)m 84.29	Outp + (61)m 89.01	out from wa n] + 0.8 x 87.76	ater heater ([(46)m 95.59	(annual) ₁ .+ (57)m	+ (59)m]	J
Heat gains from water heati (65)m= 105.28 93.57 100.	ng, kWh/mo 12 92.3 on of (65)m	onth 0.25 ´ 92.3 8 only if cylir	[0.85	× (45)m 84.29	Outp + (61)m 89.01	out from wa n] + 0.8 x 87.76	ater heater ([(46)m 95.59	(annual) ₁ .+ (57)m	+ (59)m]	J
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a)	onth 0.25 ´ 92.3 8 only if cylir	[0.85	× (45)m 84.29	Outp + (61)m 89.01	out from wa n] + 0.8 x 87.76	ater heater ([(46)m 95.59	(annual) ₁ .+ (57)m	+ (59)m]	J
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table)	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts	onth 0.25 [*] 92.3 8 only if cylir	[0.85	× (45)m 84.29	Outp + (61)m 89.01	out from wa n] + 0.8 x 87.76	ater heater ([(46)m 95.59	(annual) ₁ .+ (57)m	+ (59)m]	J
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table Metabolic gains (Table 5), V	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts	onth 0.25 ′ 92.3 8 only if cylin	[0.85 35.14 nder is	× (45)m 84.29 s in the c	Outp + (61)m 89.01 dwelling	90t from wa 1] + 0.8 x 87.76 or hot w	(46)m 95.59 ater is fr	+ (57)m 97.86 om com	+ (59)m 103.61 munity h]	J
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table Metabolic gains (Table 5), Value Jan Feb Ma	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr	92.3 8 only if cylin : May 160.23 16	[0.85 85.14 nder is	× (45)m 84.29 s in the c	Outp + (61)m 89.01 dwelling Aug 160.23	sut from wa 1] + 0.8 x 87.76 or hot w Sep 160.23	g [(46)m 95.59 ater is fr	(annual) ₁ . + (57)m 97.86 om com	+ (59)m 103.61 munity h]	(65)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Water Jan Feb Mark (66)m= 160.23 160.23 160.23	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23	onth 0.25 ′ 92.3 8 only if cylin : May 160.23 16	[0.85 85.14 nder is	× (45)m 84.29 s in the c	Outp + (61)m 89.01 dwelling Aug 160.23	sut from wa 1] + 0.8 x 87.76 or hot w Sep 160.23	g [(46)m 95.59 ater is fr	(annual) ₁ . + (57)m 97.86 om com	+ (59)m 103.61 munity h]	(65)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume 160.23 160.23 160.23 160.23 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.2	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L	onth 0.25 ′ 92.3 8 only if cylin : May 160.23 16 1, equation 24.5 2	Jun 60.23 L9 or	y (45)m 84.29 S in the c Jul 160.23 L9a), a 22.35	Outp + (61)m 89.01 dwelling Aug 160.23 lso see	Sep 160.23 Table 5	oter heater (46)m 95.59 ater is fr Oct 160.23	(annual) ₁ , + (57)m 97.86 om com Nov 160.23	+ (59)m 103.61 munity h]	(65)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume 160.23 160.23 160.23 160.24 Lighting gains (calculated in 167)m= 59.94 53.24 43.2	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Watts ar Apr 23 160.23 Appendix L 9 32.78 d in Append	onth 0.25 ′ 92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2	Jun 60.23 L9 or	y (45)m 84.29 S in the c Jul 160.23 L9a), a 22.35	Outp + (61)m 89.01 dwelling Aug 160.23 lso see	Sep 160.23 Table 5	oter heater (46)m 95.59 ater is fr Oct 160.23	(annual) ₁ , + (57)m 97.86 om com Nov 160.23	+ (59)m 103.61 munity h]	(65)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume Jan Feb Ma (66)m= 160.23 160.23 160.23 160.24 Lighting gains (calculated in (67)m= 59.94 53.24 43.2 Appliances gains (calculated (68)m= 366.17 369.97 360.	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Append	92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2 lix L, equat 314.28 2	Jun 60.23 1 L9 or 20.68 290.1	y (45)m 84.29 s in the c Jul 160.23 L9a), a 22.35 13 or L13 273.94	Outp + (61)m 89.01 dwelling Aug 160.23 dso see 29.05 3a), also 270.14	Sep 160.23 Table 5 38.99 see Tal 279.72	Oct 160.23 49.51 ole 5 300.1	(annual) ₁ , + (57)m 97.86 om com Nov 160.23	+ (59)m 103.61 munity h Dec 160.23]	(65) (66) (67)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume Jan Feb Mark (66)m= 160.23 160.23 160.23 160.21 Lighting gains (calculated in (67)m= 59.94 53.24 43.22 Appliances gains (calculated (68)m= 366.17 369.97 360. Cooking gains (calculated in (calculated	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Append 4 340.01	onth 0.25 ′ 92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2 lix L, equat 314.28 2 L, equation	Jun 60.23 1 L9 or 20.68 290.1	y (45)m 84.29 s in the c Jul 160.23 L9a), a 22.35 13 or L13 273.94	Outp + (61)m 89.01 dwelling 160.23 dso see 29.05 3a), also 270.14 , also se	Sep 160.23 Table 5 38.99 see Table 279.72	Oct 160.23 49.51 ole 5 300.1 5	(annual) ₁ , + (57)m 97.86 om com Nov 160.23 57.79	+ (59)m 103.61 munity h Dec 160.23]	(65) (66) (67)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), V Jan Feb Ma (66)m= 160.23 160.23 160.2 Lighting gains (calculated in (67)m= 59.94 53.24 43.2 Appliances gains (calculated (68)m= 366.17 369.97 360. Cooking gains (calculated in (69)m= 53.69 53.69 53.69	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Watts ar Apr 23 160.23 Appendix L 9 32.78 d in Append 4 340.01 n Appendix I 9 53.69	onth 0.25 ′ 92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2 lix L, equat 314.28 2 L, equation	Jun 60.23 1 L9 or 20.68 290.1	x (45)m 84.29 s in the c Jul 160.23 L9a), a 22.35 13 or L1: 273.94 or L15a)	Outp + (61)m 89.01 dwelling Aug 160.23 dso see 29.05 3a), also 270.14	Sep 160.23 Table 5 38.99 see Tal 279.72	Oct 160.23 49.51 ole 5 300.1	(annual) ₁ , + (57)m 97.86 om com Nov 160.23	+ (59)m 103.61 munity h Dec 160.23]	(65) (66) (67) (68)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume 160.23 160.23 160.23 160.23 160.24 160.24 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.25 160.2	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Append 4 340.01 n Appendix I 9 53.69	92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2 lix L, equat 314.28 2 L, equation 53.69 5	Jun 60.23 L9 or 20.68 tion L1 290.1 n L15 of 53.69	x (45)m 84.29 s in the c Jul 160.23 L9a), a 22.35 13 or L1: 273.94 or L15a) 53.69	Aug 160.23 Iso see 29.05 3a), also 270.14 , also se 53.69	Sep 160.23 Table 5 38.99 see Tal 279.72 ee Table 53.69	Oct 160.23 49.51 ole 5 300.1 5 53.69	Nov 160.23 57.79 325.83	+ (59)m 103.61 munity h Dec 160.23 61.6 350.02]	(65) (66) (67) (68)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume Jan Feb Mark (66)m= 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.23 160.2	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Append 4 340.01 n Appendix I 9 53.69 le 5a) 3	92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2 lix L, equat 314.28 2 L, equation 53.69 5	Jun 60.23 1 L9 or 20.68 290.1 1 L15 0 53.69	x (45)m 84.29 s in the c Jul 160.23 L9a), a 22.35 13 or L1: 273.94 or L15a)	Outp + (61)m 89.01 dwelling 160.23 dso see 29.05 3a), also 270.14 , also se	Sep 160.23 Table 5 38.99 see Table 279.72	Oct 160.23 49.51 ole 5 300.1 5	(annual) ₁ , + (57)m 97.86 om com Nov 160.23 57.79	+ (59)m 103.61 munity h Dec 160.23]	(65) (66) (67) (68) (69)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume 160.23 160.23 160.23 160.23 160.24 160.24 160.25 160.26 160.26 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Append 4 340.01 n Appendix I 9 53.69 le 5a) gative value	92.3 8 only if cylin : May 160.23 16 ., equation 24.5 2 lix L, equat 314.28 2 L, equation 53.69 5	Jun 60.23 1 L9 or 20.68 1 L15 (633.69) 3 5)	x (45)m 84.29 s in the control of	Aug 160.23 Iso see 29.05 3a), also 270.14 , also se 53.69	Sep 160.23 Table 5 38.99 see Tal 279.72 ee Table 53.69	Oct 160.23 49.51 ole 5 300.1 5 53.69	Nov 160.23 57.79 325.83	+ (59)m 103.61 munity h Dec 160.23 61.6 350.02]	(65) (66) (67) (68) (69) (70)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume 160.23 160.23 160.23 160.23 160.24 160.25 Lighting gains (calculated in (67)m= 59.94 53.24 43.24 Appliances gains (calculated in (68)m= 366.17 369.97 360.00 Cooking gains (calculated in (69)m= 53.69 53.69 53.69 Pumps and fans gains (Table 70)m= 3 3 3 3 Losses e.g. evaporation (ne (71)m= -106.82 -106.82 -106.82 -106.82	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Append 4 340.01 n Appendix I 9 53.69 le 5a) gative value 82 -106.82	92.3 8 only if cylin : May 160.23 16 ., equation 24.5 2 lix L, equat 314.28 2 L, equation 53.69 5	Jun 60.23 1 L9 or 20.68 290.1 1 L15 0 53.69	x (45)m 84.29 s in the c Jul 160.23 L9a), a 22.35 13 or L1: 273.94 or L15a) 53.69	Aug 160.23 Iso see 29.05 3a), also 270.14 , also se 53.69	Sep 160.23 Table 5 38.99 see Tal 279.72 ee Table 53.69	Oct 160.23 49.51 ole 5 300.1 5 53.69	Nov 160.23 57.79 325.83	+ (59)m 103.61 munity h Dec 160.23 61.6 350.02]	(65) (66) (67) (68) (69)
Heat gains from water heati (65)m= 105.28 93.57 100. include (57)m in calculation 5. Internal gains (see Table 5), Volume 160.23 160.23 160.23 160.23 160.24 160.24 160.25 160.26 160.26 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.27 160.	ng, kWh/mo 12 92.3 on of (65)m e 5 and 5a) Vatts ar Apr 23 160.23 Appendix L 9 32.78 d in Appendi 4 340.01 n Appendix I 9 53.69 le 5a) gative value 82 -106.82 5)	92.3 8 only if cylin : May 160.23 16 -, equation 24.5 2 lix L, equat 314.28 2 L, equation 53.69 5 aes) (Table \$ -106.82 -10	Jun 60.23 1 L9 or 20.68 1 L15 (633.69) 3 5)	x (45)m 84.29 s in the control Jul 160.23 120.35 13 or L13 273.94 or L15a) 53.69	Aug 160.23 Iso see 29.05 3a), also 270.14 , also se 53.69	Sep 160.23 Table 5 38.99 see Tal 279.72 ee Table 53.69	Oct 160.23 49.51 ole 5 300.1 5 53.69	Nov 160.23 57.79 325.83	+ (59)m 103.61 munity h Dec 160.23 61.6 350.02]	(65) (66) (67) (68) (69) (70)

Total ir	Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$														
(73)m=	677.71	672.56	648.36	611.09	572.95	539.13	519.69	528	.93	550.7	588.19	629.64	660.98		(73)
6. Sola	ar gains	S:							•	1					
Solar ga	ains are o	calculated	using sola	r flux from	Table 6a	and assoc	ciated equa	tions 1	to co	nvert to the	e applic	able orientat	ion.		
Orienta		Access F	actor	Area		Flu			т.	g_ 		FF		Gains	
	<u>'</u>	Table 6d		m²			ble 6a			able 6b		Table 6c		(W)	
North	0.9x	0.77	X	0.8	36	х	10.63	X		0.63	x	0.7	=	2.79	(74)
North	0.9x	0.77	X	1.4	18	х	10.63	X		0.63	X	0.7	=	4.81	(74)
North	0.9x	0.77	X	1.	4	х	10.63	X		0.63	x	0.7	=	4.55	(74)
North	0.9x	0.77	X	0.8	36	X	20.32	X		0.63	×	0.7	=	5.34	(74)
North	0.9x	0.77	X	1.4	18	X	20.32	X		0.63	X	0.7	=	9.19	(74)
North	0.9x	0.77	X	1.	4	X	20.32	X		0.63	x	0.7	=	8.69	(74)
North	0.9x	0.77	X	0.8	36	x :	34.53	X		0.63	×	0.7	=	9.08	(74)
North	0.9x	0.77	X	1.4	18	x :	34.53	X		0.63	x	0.7	=	15.62	(74)
North	0.9x	0.77	X	1.	4	X :	34.53	X		0.63	x	0.7	=	14.77	(74)
North	0.9x	0.77	X	0.8	36	X	55.46	X		0.63	X	0.7	=	14.58	(74)
North	0.9x	0.77	х	1.4	18	X	55.46	X		0.63	x	0.7	=	25.09	(74)
North	0.9x	0.77	х	1.	4	X	55.46	X		0.63	x	0.7	=	23.73	(74)
North	0.9x	0.77	X	0.8	36	X	74.72	X		0.63	X	0.7	=	19.64	(74)
North	0.9x	0.77	Х	1.4	18	X	74.72	X		0.63	x	0.7	=	33.79	(74)
North	0.9x	0.77	х	1.	4	X	74.72	X		0.63	x	0.7	=	31.97	(74)
North	0.9x	0.77	X	0.8	36	X	79.99	X		0.63	X	0.7	=	21.02	(74)
North	0.9x	0.77	X	1.4	18	X	79.99	X		0.63	X	0.7	=	36.18	(74)
North	0.9x	0.77	х	1.	4	X	79.99	X		0.63	x	0.7	=	34.22	(74)
North	0.9x	0.77	х	0.8	36	X	74.68	X		0.63	x	0.7	=	19.63	(74)
North	0.9x	0.77	X	1.4	18	X	74.68	X		0.63	x	0.7	=	33.78	(74)
North	0.9x	0.77	Х	1.	4	X	74.68	X		0.63	x	0.7	=	31.95	(74)
North	0.9x	0.77	Х	0.8	36	X	59.25	X		0.63	x	0.7	=	15.57	(74)
North	0.9x	0.77	X	1.4	18	X	59.25	X		0.63	x	0.7	=	26.8	(74)
North	0.9x	0.77	X	1.	4	X	59.25	X		0.63	x	0.7	=	25.35	(74)
North	0.9x	0.77	Х	0.8	36	x	41.52	X		0.63	x	0.7	=	10.91	(74)
North	0.9x	0.77	X	1.4	18	x	41.52	X		0.63	X	0.7	=	18.78	(74)
North	0.9x	0.77	X	1.	4	X .	41.52	X		0.63	x	0.7	=	17.76	(74)
North	0.9x	0.77	X	0.8	36	X	24.19	X		0.63	X	0.7	=	6.36	(74)
North	0.9x	0.77	X	1.4	48	X	24.19	X		0.63	x	0.7	=	10.94	(74)
North	0.9x	0.77	X	1.	4	X	24.19	X		0.63	×	0.7	=	10.35	(74)
North	0.9x	0.77	X	0.8	36	х	13.12	x		0.63	x	0.7	=	3.45	(74)
North	0.9x	0.77	X	1.4	18	x	13.12	X		0.63	x	0.7	=	5.93	(74)
North	0.9x	0.77	X	1.	4	x	13.12	X		0.63	×	0.7	=	5.61	(74)
North	0.9x	0.77	X	0.8	36	x	8.86	x		0.63	X	0.7	=	2.33	(74)

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North	0.9x	0.77	X	1.48	X	8.86	X	0.63	X	0.7	=	4.01	(74)
North	0.9x	0.77	X	1.4	X	8.86	Х	0.63	Х	0.7	=	3.79	(74)
South	0.9x	0.77	X	1.35	X	46.75	X	0.63	X	0.7	=	19.29	(78)
South	0.9x	0.77	X	3.33	X	46.75	X	0.63	X	0.7	=	47.58	(78)
South	0.9x	0.77	X	0.99	X	46.75	X	0.63	X	0.7	=	14.15	(78)
South	0.9x	0.77	X	1.46	X	46.75	X	0.63	X	0.7	=	20.86	(78)
South	0.9x	0.77	X	1.35	X	76.57	X	0.63	X	0.7	=	31.59	(78)
South	0.9x	0.77	X	3.33	X	76.57	X	0.63	X	0.7	=	77.92	(78)
South	0.9x	0.77	X	0.99	X	76.57	X	0.63	X	0.7	=	23.17	(78)
South	0.9x	0.77	X	1.46	X	76.57	x	0.63	X	0.7	=	34.16	(78)
South	0.9x	0.77	X	1.35	X	97.53	x	0.63	X	0.7	=	40.24	(78)
South	0.9x	0.77	X	3.33	X	97.53	X	0.63	X	0.7	=	99.26	(78)
South	0.9x	0.77	X	0.99	x	97.53	x	0.63	x	0.7	=	29.51	(78)
South	0.9x	0.77	X	1.46	X	97.53	x	0.63	X	0.7	=	43.52	(78)
South	0.9x	0.77	X	1.35	X	110.23	X	0.63	X	0.7	=	45.48	(78)
South	0.9x	0.77	X	3.33	X	110.23	x	0.63	x	0.7	=	112.18	(78)
South	0.9x	0.77	X	0.99	X	110.23	x	0.63	X	0.7	=	33.35	(78)
South	0.9x	0.77	X	1.46	X	110.23	x	0.63	X	0.7	=	49.19	(78)
South	0.9x	0.77	X	1.35	x	114.87	x	0.63	X	0.7	=	47.39	(78)
South	0.9x	0.77	X	3.33	X	114.87	X	0.63	X	0.7	=	116.9	(78)
South	0.9x	0.77	X	0.99	X	114.87	x	0.63	X	0.7	=	34.76	(78)
South	0.9x	0.77	X	1.46	x	114.87	x	0.63	X	0.7	=	51.25	(78)
South	0.9x	0.77	X	1.35	X	110.55	x	0.63	X	0.7	=	45.61	(78)
South	0.9x	0.77	X	3.33	X	110.55	x	0.63	X	0.7	=	112.5	(78)
South	0.9x	0.77	X	0.99	x	110.55	x	0.63	x	0.7	=	33.45	(78)
South	0.9x	0.77	X	1.46	X	110.55	x	0.63	X	0.7	=	49.33	(78)
South	0.9x	0.77	X	1.35	X	108.01	X	0.63	X	0.7	=	44.56	(78)
South	0.9x	0.77	X	3.33	x	108.01	x	0.63	X	0.7	=	109.92	(78)
South	0.9x	0.77	X	0.99	X	108.01	x	0.63	X	0.7	=	32.68	(78)
South	0.9x	0.77	X	1.46	X	108.01	X	0.63	X	0.7	=	48.19	(78)
South	0.9x	0.77	X	1.35	x	104.89	x	0.63	X	0.7	=	43.28	(78)
South	0.9x	0.77	X	3.33	X	104.89	x	0.63	X	0.7	=	106.75	(78)
South	0.9x	0.77	X	0.99	X	104.89	x	0.63	X	0.7	=	31.74	(78)
South	0.9x	0.77	X	1.46	x	104.89	x	0.63	x	0.7	=	46.8	(78)
South	0.9x	0.77	X	1.35	x	101.89	x	0.63	x	0.7	=	42.04	(78)
South	0.9x	0.77	X	3.33	x	101.89	x	0.63	x	0.7	=	103.69	(78)
South	0.9x	0.77	X	0.99	x	101.89	x	0.63	x	0.7	=	30.83	(78)
South	0.9x	0.77	x	1.46	x	101.89	x	0.63	x	0.7	=	45.46	(78)
South	0.9x	0.77	X	1.35	x	82.59	x	0.63	x	0.7	=	34.07	(78)
South	0.9x	0.77	x	3.33	x	82.59	x	0.63	x	0.7	=	84.05	(78)
South	0.9x	0.77	X	0.99	x	82.59	x	0.63	x	0.7	=	24.99	(78)

South 0.9x 0.77 x 1.146 x 82.29 x 0.63 x 0.7 = 38.85 (78) South 0.9x 0.77 x 1.35 x 55.42 x 0.63 x 0.7 = 22.86 (78) South 0.9x 0.77 x 2.333 x 58.42 x 0.63 x 0.7 = 22.86 (78) South 0.9x 0.77 x 1.46 x 55.42 x 0.63 x 0.7 = 16.77 (78) South 0.9x 0.77 x 1.46 x 55.42 x 0.63 x 0.7 = 16.77 (78) South 0.9x 0.77 x 1.46 x 55.42 x 0.63 x 0.7 = 16.77 (78) South 0.9x 0.77 x 1.35 x 40.4 x 0.63 x 0.7 = 146.77 (78) South 0.9x 0.77 x 0.333 x 40.4 x 0.63 x 0.7 = 146.77 (78) South 0.9x 0.77 x 0.333 x 40.4 x 0.63 x 0.7 = 146.77 (78) South 0.9x 0.77 x 0.99 x 40.4 x 0.63 x 0.7 = 141.11 (78) South 0.9x 0.77 x 0.99 x 40.4 x 0.63 x 0.7 = 112.22 (78) South 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 118.03 (78) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 13.80 (78) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 13.80 (78) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 13.80 (78) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 15.67 (80) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.63 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.64 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.63 x 0.63 x 0.7 = 5.67 (80) West 0.9x 0.77 x 0.55 x 18.63 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.55 x 18.63 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 14.11 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 17.88 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 17.88 (80) West 0.9x 0.77 x 0.55 x 18.22 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.55		_							_										
South 0.0x	South	0.9x	0.77		X	1.46	6	X	8	2.59	X	0.63		x	0.7	=	36	.85	(78)
South 0.5% 0.77 × 0.59 × 40.4 × 0.63 × 0.7 = 16.677 [78] South 0.5% 0.77 × 1.48 × 55.42 × 0.63 × 0.7 = 16.677 [78] South 0.5% 0.77 × 1.48 × 55.42 × 0.63 × 0.7 = 16.677 [78] South 0.5% 0.77 × 1.48 × 1.55 × 40.4 × 0.63 × 0.7 = 16.677 [78] South 0.5% 0.77 × 0.59 × 40.4 × 0.63 × 0.7 = 14.111 [78] South 0.5% 0.77 × 0.59 × 40.4 × 0.63 × 0.7 = 12.22 [78] South 0.5% 0.77 × 0.59 × 40.4 × 0.63 × 0.7 = 12.22 [78] South 0.5% 0.77 × 0.55 × 19.64 × 0.63 × 0.7 = 12.22 [78] South 0.5% 0.77 × 0.55 × 19.64 × 0.63 × 0.7 = 13.00 [78] West 0.5% 0.77 × 0.55 × 19.64 × 0.63 × 0.7 = 15.00 [78] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 3 .80 West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 5.87 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 14.11 [80] West 0.5% 0.77 × 0.55 × 33.42 × 0.63 × 0.7 = 14.11 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.11 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.11 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.14 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.14 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.44 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.44 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.44 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.44 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.44 [80] West 0.5% 0.77 × 0.55 × 13.50 × 13.50 × 0.63 × 0.7 = 14.44 [80] West 0.	South	0.9x	0.77		x	1.3	5	x	5	5.42	X	0.63		x	0.7	=	22	.86	(78)
South 0.3x 0.77 x 1.46 x 5542 x 0.63 x 0.77 = 24.73 (78) South 0.9x 0.77 x 1.35 x 40.4 x 0.63 x 0.7 = 16.67 (78) South 0.9x 0.77 x 0.39 x 40.4 x 0.63 x 0.7 = 16.67 (78) South 0.9x 0.77 x 0.39 x 40.4 x 0.63 x 0.7 = 16.67 (78) South 0.9x 0.77 x 0.39 x 40.4 x 0.63 x 0.7 = 12.22 (78) South 0.9x 0.77 x 0.39 x 40.4 x 0.63 x 0.7 = 12.22 (78) South 0.9x 0.77 x 0.39 x 40.4 x 0.63 x 0.7 = 18.03 (78) West 0.9x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 18.03 (78) West 0.9x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 3 (80) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (90) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.1 (90) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.1 (90) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x 0.5 x 115.09 x 0.63 x 0.7 = 14.4 (80) West 0.9x 0.77 x	South	0.9x	0.77		x	3.33	3	x	5	5.42	X	0.63		x	0.7	=	56	.4	(78)
South 0.3x 0.77 x 1.35 x 40.4 x 0.63 x 0.77 = 16.67 (78) South 0.3x 0.77 x 0.33 x 40.4 x 0.63 x 0.7 = 11.22 (78) South 0.3x 0.77 x 0.99 x 40.4 x 0.63 x 0.7 = 12.22 (78) South 0.3x 0.77 x 1.46 x 40.4 x 0.63 x 0.7 = 12.22 (78) South 0.3x 0.77 x 1.46 x 40.4 x 0.63 x 0.7 = 12.22 (78) South 0.3x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 13.08 West 0.3x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 3 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 3.3 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 14.11 (80) West 0.3x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 14.11 (80) West 0.3x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 14.11 (80) West 0.3x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.3x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.3x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.3x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.3x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 11.44 (80) West 0.3x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 11.44 (80) West 0.3x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 11.44 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 11.44 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80) West 0.3x 0.77 x 0.5 x 146 x 115.20 x 0.63 x 0.7 = 14.47 (80)	South	0.9x	0.77		x	0.99	9	x	5	5.42	X	0.63		x	0.7	=	16	.77	(78)
South	South	0.9x	0.77		x	1.46	6	x	5	5.42	X	0.63		x [0.7	=	24	.73	(78)
South 0.5x 0.77 x 0.99 x 0.40.4 x 0.63 x 0.7 = 11.22 (78) South 0.5x 0.77 x 1.46 x 40.4 x 0.63 x 0.7 = 11.22 (78) South 0.5x 0.77 x 0.5 x 1.46 x 40.4 x 0.63 x 0.7 = 118.03 (78) West 0.5x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 3 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 3 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.5x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 9.67 (80) West 0.5x 0.77 x 0.5 x 38.27 x 0.63 x 0.7 = 9.67 (80) West 0.5x 0.77 x 0.5 x 38.27 x 0.63 x 0.7 = 9.67 (80) West 0.5x 0.77 x 0.5 x 32.8 x 0.63 x 0.7 = 14.1 (80) West 0.5x 0.77 x 0.5 x 32.28 x 0.63 x 0.7 = 14.1 (80) West 0.5x 0.77 x 0.5 x 32.28 x 0.63 x 0.7 = 14.1 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 143.00 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 143.00 x 0.63 x 0.7 = 17.89 (80) West 0.5x 0.77 x 0.5 x 143.00 x 0.63 x 0.7 = 144.4 (80) West 0.5x 0.77 x 0.5 x 144.00 x 0.63 x 0.7 = 144.4 (80) West 0.5x 0.77 x 0.5 x 144.00 x 0.63 x 0.7 = 144.4 (80) West 0.5x 0.77 x 0.5 x 144.00 x 0.63 x 0.7 = 144.4 (80) West 0.5x 0.77 x 0	South	0.9x	0.77		x	1.3	5	x		40.4	X	0.63		x	0.7	=	16	.67	(78)
South	South	0.9x	0.77		x	3.33	3	x	4	40.4	X	0.63		x	0.7	=	41	.11	(78)
West 0.9x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 3 (80) West 0.9x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 83.27 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 83.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 83.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 83.27 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.89 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.89 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.89 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 114.47 (80) West 0.9x 0.77 x 0.5 x 14.49 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.49 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.49 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 14.59 x 0.63 x 0.7 = 14.47 (80) West 0.9	South	0.9x	0.77		x	0.99	9	x	4	40.4	X	0.63		x	0.7	=	12	22	(78)
West 0.9x 0.77 x 0.5 x 19.64 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 38.42 x 0.63 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.41 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 14.41 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 140.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 140.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 44.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 64.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x	South	0.9x	0.77		x	1.46	6	x		40.4	X	0.63		x	0.7	=	18	.03	(78)
West 0.9x 0.77 x 0.5 x 0.5 x 0.83 x 0.7 = 5.87 (80) West 0.9x 0.77 x 0.5 x 0.5 x 0.83 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 0.5 x 0.83 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 0.5 x 0.83 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 0.5 x 0.83 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 0.5 x 0.83 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 0.5 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 12.49 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 12.49 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 12.49 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x	West	0.9x	0.77		x	0.5	i	x	1	9.64	X	0.63		x	0.7	=	(3	(80)
West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.07 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.07 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.07 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.07 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80)	West	0.9x	0.77		x	0.5	i	x	1	9.64	X	0.63		x	0.7	=	;	3	(80)
West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 63.27 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 145.59 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80)	West	0.9x	0.77		x	0.5	i	x	3	8.42	X	0.63		x	0.7	=	5.	37	(80)
West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 9.67 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 92.28 x 0.63 x 0.7 = 14.1 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 140.20 x 0.63 x 0.7 = 144.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 144.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 144.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 144.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 144.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80)	West	0.9x	0.77		x	0.5	;	x	3	88.42	x	0.63		x	0.7		5.	37	(80)
West	West	0.9x	0.77		x	0.5	;	х	6	3.27	X	0.63		x	0.7	=	9.	67	(80)
West	West	0.9x	0.77		x	0.5	i	x	6	3.27	X	0.63		x	0.7	=	9.	67	(80)
West 0.9x 0.77	West	0.9x	0.77		x	0.5		x	9	2.28	x	0.63		x [0.7	_ =	14	.1	(80)
West 0.9x 0.77 x 0.5 x 113.09 x 0.63 x 0.7 = 17.28 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 24.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80)	West	0.9x	0.77		x	0.5		x	9	2.28	x	0.63		x	0.7	_ =	14	.1	(80)
West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 115.77 x 0.63 x 0.7 = 17.69 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 110.22 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80)	West	0.9x	0.77		x	0.5		x	1	13.09	x	0.63		x	0.7		17	28	(80)
West	West	0.9x	0.77		x	0.5		x	1	13.09	x	0.63		x [0.7	_ =	17	28	(80)
West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) Temperature during heating periods in the living area from Table 9, Th1 (°C) (21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5		x	1	15.77	x	0.63		x T	0.7	_ =	17	.69	(80)
West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 16.84 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (63) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	i	x	1	15.77	X	0.63		x	0.7		17	.69	(80)
West 0.9x 0.77	West	0.9x	0.77		x	0.5		x	1	10.22	x	0.63		x [0.7	_ =	16	.84	(80)
West 0.9x 0.77 x 0.5 x 94.68 x 0.63 x 0.7 = 14.47 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Total gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5		x	1	10.22	x	0.63		x	0.7	=	16	.84	(80)
West 0.9x 0.77 x 0.5 x 73.59 x 0.63 x 0.7 = 11.24 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	,	x	9	4.68	x	0.63		x	0.7	_ =	14	.47	(80)
West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5		x	9	4.68	x	0.63		x [0.7	_ =	14	.47	(80)
West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m =	West	0.9x	0.77		x	0.5		x	7	3.59	x	0.63		x T	0.7	_ =	11	24	(80)
West 0.9x 0.77 x 0.5 x 45.59 x 0.63 x 0.7 = 6.97 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83)	West	0.9x	0.77		x	0.5	,	x	7	3.59	x	0.63		x T	0.7	_ =	11	24	(80)
West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	i	x	4	5.59	x	0.63		x	0.7		6.	97	(80)
West 0.9x 0.77 x 0.5 x 24.49 x 0.63 x 0.7 = 3.74 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m = 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	i	х	4	5.59	X	0.63		х	0.7	_ =	6.	97	(80)
West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m= 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m= 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	i	х	2	4.49	x	0.63	一	x [0.7	_ =	3.	74	(80)
West 0.9x 0.77 x 0.5 x 16.15 x 0.63 x 0.7 = 2.47 (80) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m= 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 (83) Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m= 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	i	х	2	4.49	x	0.63		x [0.7	=	3.	74	(80)
Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m (83)m = 120.03	West	0.9x	0.77		x	0.5	;	x	1	6.15	x	0.63		x [0.7	_ =	2.	47	(80)
(83)m= 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m= 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a)	West	0.9x	0.77		x	0.5	;	x	1	6.15	x	0.63		x [0.7	_ =	2.	47	(80)
(83)m= 120.03 201.81 271.33 331.8 370.27 367.69 354.4 325.22 291.95 221.54 143.23 103.1 Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m= 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a)		L												_					_
Total gains – internal and solar (84)m = (73)m + (83)m , watts (84)m= 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	Solar g	ains in	watts, ca	lculat	ed	for each	mon	th			(83)m	= Sum(74)n	n(82	2)m					
(84)m= 797.74 874.37 919.69 942.89 943.22 906.82 874.09 854.15 842.65 809.73 772.87 764.07 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a)	(83)m=	120.03	201.81	271.3	3	331.8	370.27	7 3	67.69	354.4	325	22 291.95	5 22	21.54	143.23	103.1			(83)
7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	Total g	ains – i	nternal a	nd so	lar	(84)m =	(73)n	า + (83)m	, watts									
Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85) Utilisation factor for gains for living area, h1,m (see Table 9a)	(84)m=	797.74	874.37	919.6	9	942.89	943.22	2 9	06.82	874.09	854	15 842.65	5 80	9.73	772.87	764.07			(84)
Utilisation factor for gains for living area, h1,m (see Table 9a)	7. Mea	an inter	nal temp	eratu	re (heating	seaso	n)											
Utilisation factor for gains for living area, h1,m (see Table 9a)						Ĭ			area	from Tab	ole 9,	Th1 (°C)					2	1	(85)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	-		_					_											_
		Jan	Feb	Ma	r_	Apr	Ma	/	Jun	Jul	A	ug Sep		Oct	Nov	Dec			
	•																_		

(86)m= 0.93 0.9 0.87 0.82 0.73 0.59 0.46 0.48 0.65 0.82 0.9 0.93	(86)
Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)	
(87)m= 19.14 19.37 19.71 20.14 20.52 20.81 20.93 20.92 20.74 20.26 19.63 19.09	(87)
Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)	
(88)m= 20.02 20.02 20.02 20.03 20.03 20.04 20.04 20.04 20.03 20.03 20.03 20.02	(88)
Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)	
(89)m= 0.92 0.89 0.85 0.79 0.68 0.53 0.37 0.4 0.59 0.78 0.88 0.92	(89)
Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)	
(90)m= 17.56 17.88 18.37 18.97 19.5 19.86 19.99 19.98 19.77 19.15 18.27 17.49	(90)
$fLA = Living area \div (4) =$	0.17 (91)
Mean internal temperature (for the whole dwelling) = $fLA \times T1 + (1 - fLA) \times T2$	
(92)m= 17.83 18.14 18.6 19.17 19.68 20.03 20.15 20.14 19.94 19.34 18.51 17.77	(92)
Apply adjustment to the mean internal temperature from Table 4e, where appropriate	_
(93)m= 17.68 17.99 18.45 19.02 19.53 19.88 20 19.99 19.79 19.19 18.36 17.62	(93)
8. Space heating requirement	
Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-cathe utilisation factor for gains using Table 9a	lculate
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	:7
Utilisation factor for gains, hm:	_
(94)m= 0.89 0.86 0.82 0.76 0.66 0.51 0.37 0.39 0.58 0.75 0.85 0.89	(94)
Useful gains, hmGm , W = (94)m x (84)m	_
(95)m= 706.82 751.35 754.54 713.74 621.98 466.21 321.03 335.46 484.55 609.34 657.87 683.75	(95)
Monthly average external temperature from Table 8 (96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 16.4 14.1 10.6 7.1 4.2	(96)
Heat loss rate for mean internal temperature, Lm , $W = [(39)m \times [(93)m - (96)m]]$	
(97)m= 1352.62 1320.28 1203.19 1010.23 779.53 521.51 336.41 354.59 564.28 856.14 1125.51 1345.9	4 (97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m	_
(98)m= 480.48 382.32 333.79 213.47 117.22 0 0 0 1 183.62 336.7 492.67	$\overline{\gamma}$
Total per year (kWh/year) = Sum(98) _{15,912}	= 2540.27 (98)
Space heating requirement in kWh/m²/year	27.17 (99)
9a. Energy requirements – Individual heating systems including micro-CHP)	
Space heating:	
Fraction of space heat from secondary/supplementary system	0 (201)
Fraction of space heat from main system(s) $(202) = 1 - (201) =$	1 (202)
Fraction of total heating from main system 1 $(204) = (202) \times [1 - (203)] =$	1 (204)
Efficiency of main space heating system 1	93.2 (206)
Efficiency of secondary/supplementary heating system, %	0 (208)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	kWh/year
Space heating requirement (calculated above)	_
480.48 382.32 333.79 213.47 117.22 0 0 0 0 183.62 336.7 492.67	•
$(211)m = \{[(98)m \times (204)] \} \times 100 \div (206)$	(211)
515.53 410.21 358.15 229.04 125.77 0 0 0 0 197.01 361.27 528.62	-
Total (kWh/year) =Sum(211) _{15,1012} =	2725.61 (211)

(215)m= 0 0	0	0	0	0	0	0	0	0	0	0]	
						Tota	l (kWh/yea	ar) =Sum(2	215) _{15,101}		0	(215
Water heating												_
Output from water heat	ter (calcu 209.13	ulated al	oove) 185.64	167.05	161.55	175.73	174.94	195.51	205.32	219.63	1	
Efficiency of water hear		100.0	105.04	107.03	101.55	173.73	174.94	193.31	205.52	219.03	80.1	(216
217)m= 87.09 86.84	86.36	85.45	83.93	80.1	80.1	80.1	80.1	84.95	86.43	87.21	0011	` (217
Fuel for water heating,	kWh/mc	onth									J	
(219)m = (64) m x 100 (219)m = 257.95 228.43) ÷ (217) 242.18	m 220.73	221.19	208.55	201.68	219.39	218.4	230.16	237.56	251.85	1	
219/111- 237.93 220.43	242.10	220.73	221.19	200.55	201.00		I = Sum(2:		237.30	231.03	2738.07	(219
Annual totals									Wh/yea	r	kWh/yea	
Space heating fuel use	ed, main	system	1								2725.61	
Water heating fuel used	d										2738.07	
Electricity for pumps, fa	ans and	electric	keep-ho	t								
central heating pump:										30]	(230
boiler with a fan-assis	ted flue									45	j	(230
											1	
Total electricity for the	above, k	kWh/yea	r			sum	of (230a).	(230g) =			75	(23
•	above, k	(Wh/yea	r			sum	of (230a).	(230g) =			75 423.4	=
Electricity for lighting		⟨Wh/yea	r			sum	of (230a).	(230g) =				(232
Electricity for lighting Electricity generated by	y PVs	·		+ (231)	+ (232).			(230g) =			423.4	(231 (232 (233 (338
Electricity for lighting Electricity generated by	y PVs for all us	ses (211)(221)	+ (231)	+ (232).			(230g) =			423.4	(232
Total electricity for the an Electricity for lighting Electricity generated by Total delivered energy 10a. Fuel costs - indiv	y PVs for all us	ses (211)(221)								423.4 -1708.91 4253.17	(232
Electricity for lighting Electricity generated by Total delivered energy	y PVs for all us	ses (211)(221)	Fu				(230g) = Fuel P (Table	rice		423.4	(232
Electricity for lighting Electricity generated by Total delivered energy 10a. Fuel costs - indiv	y PVs for all us vidual he	ses (211)(221)	Fu- kW	el			Fuel P	rice 12)	x 0.01 =	423.4 -1708.91 4253.17	(232
Electricity for lighting Electricity generated by Total delivered energy 10a. Fuel costs - indiv	y PVs for all us vidual he	ses (211 eating sy)(221)	Fu kW (211	el /h/year			Fuel P (Table	rice 12)	x 0.01 = x 0.01 =	423.4 -1708.91 4253.17 Fuel Cost £/year	(232
Electricity for lighting Electricity generated by Total delivered energy 10a. Fuel costs - indiv Space heating - main s	y PVs for all us vidual he system 1	ses (211 eating sy)(221)	Fu kW (211	el /h/year			Fuel P (Table	rice 12)		423.4 -1708.91 4253.17 Fuel Cost £/year 94.85	(232) (233) (338)
Electricity for lighting Electricity generated by Total delivered energy	y PVs for all us vidual he system 1 system 2 dary	ses (211 eating sy)(221)	Fu kW (211	el /h/year I) x B) x			Fuel P (Table	Price 12)	x 0.01 =	423.4 -1708.91 4253.17 Fuel Cost £/year 94.85	(232 (233 (338 (241 (241
Electricity for lighting Electricity generated by Total delivered energy 10a. Fuel costs - indiv Space heating - main s Space heating - main s Space heating - second	y PVs for all us vidual he system 1 system 2 dary ner fuel)	ses (211 eating sy)(221)	Fu kW (211 (213	el /h/year l) x 3) x 5) x			Fuel P (Table 3.4	Price 12)	x 0.01 = x 0.01 =	423.4 -1708.91 4253.17 Fuel Cost £/year 94.85 0 0	(232 (233 (233 (338 (241 (241 (242
Electricity for lighting Electricity generated by Total delivered energy 10a. Fuel costs - indiv Space heating - main s Space heating - main s Space heating - second Water heating cost (oth	y PVs for all us vidual he system 1 system 2 dary her fuel) ric keep-	ses (211 eating sy)(221) stems:	Fu kW (211 (213 (215 (219 (231	el /h/year /l) x /s3) x /s5) x /s9)	(237b)	=	Fuel P (Table 3.4 0 13. 13.	Price 12)	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	423.4 -1708.91 4253.17 Fuel Cost £/year 94.85 0 0 95.28 9.89	(232 (233 (338 (240 (241 (242 (247
Electricity for lighting Electricity generated by Fotal delivered energy 10a. Fuel costs - indiv Space heating - main s Space heating - main s Space heating - second Vater heating cost (oth Pumps, fans and electricity off-peak tariff, list ea	y PVs for all us vidual he system 1 system 2 dary her fuel) ric keep-	ses (211 eating sy)(221) stems:	Fu kW (211 (213 (215 (219 (231	el /h/year l) x 3) x 5) x 9)	(237b)	=	Fuel P (Table 3.4 0 13. 13.	Price 12) 18 19 19 19 10 10 10 10 10 10 10 10 10 10 10 10 10	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	423.4 -1708.91 4253.17 Fuel Cost £/year 94.85 0 0 95.28 9.89	(232 (233 (338 (240 (241 (242 (247
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Energy cost factor (ECF)	[(255) x (256)] ÷ [(4) + 45.0] =		0.46 (257)
SAP rating (Section 12)			93.63 (258)
12a. CO2 emissions – Individual heati	ng systems including micro-CHP		
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	588.73 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	591.42 (264)
Space and water heating	(261) + (262) + (263) + (264)	=	1180.15 (265)
Electricity for pumps, fans and electric k	keep-hot (231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	219.74 (268)
Energy saving/generation technologies Item 1		0.519 =	-886.93 (269)
Total CO2, kg/year	SI	um of (265)(271) =	551.9 (272)
CO2 emissions per m ²	(2	272) ÷ (4) =	5.9 (273)
El rating (section 14)			95 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	3325.24 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22	3340.45 (264)
Space and water heating	(261) + (262) + (263) + (264)	=	6665.69 (265)
Electricity for pumps, fans and electric k	keep-hot (231) x	3.07	230.25 (267)
Electricity for lighting	(232) x	0 =	1299.84 (268)
Energy saving/generation technologies Item 1		3.07 =	-5246.36 (269)
'Total Primary Energy	SI	um of (265)(271) =	2949.41 (272)

 $(272) \div (4) =$

Primary energy kWh/m²/year

(273)

31.55

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 29 November 2022

Property Details: Plot 3

Dwelling type: Semi-detached House

Located in:EnglandRegion:East Anglia

Cross ventilation possible:YesNumber of storeys:2Front of dwelling faces:North

Overshading: Average or unknown

Overhangs: None

Thermal mass parameter: Indicative Value Low

Night ventilation: False

Blinds, curtains, shutters:

Ventilation rate during hot weather (ach):

Dark-coloured curtain or roller blind
4 (Windows open half the time)

Overheating Details:

Summer ventilation heat loss coefficient: 296.14 (P1)

Transmission heat loss coefficient: 5

Summer heat loss coefficient: 355.19 (P2)

Overhangs:

Orientation:	Ratio:	Z_overhangs:
South (W_97)	0	1
North (W_98)	0	1
North (W_99)	0	1
North (W_100)	0	1
South (W_101)	0	1
South (W_102)	0	1
West (W_103)	0	1
West (W_104)	0	1
South (W_105)	0	1

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
South (W_97)	0.85	0.9	1	0.76	(P8)
North (W_98)	0.85	0.9	1	0.76	(P8)
North (W_99)	0.85	0.9	1	0.76	(P8)
North (W_100)	0.85	0.9	1	0.76	(P8)
South (W_101)	0.85	0.9	1	0.76	(P8)
South (W_102)	0.85	0.9	1	0.76	(P8)
West (W_103)	0.85	0.9	1	0.76	(P8)
West (W_104)	0.85	0.9	1	0.76	(P8)
South (W_105)	0.85	0.9	1	0.76	(P8)

Solar gains:

Orientation		Area	Flux	g_	FF	Shading	Gains
South (W_97)	0.9 x	1.35	114.84	0.63	0.7	0.76	47.07
North (W_98)	0.9 x	0.86	82.12	0.63	0.7	0.76	21.44
North (W_99)	0.9 x	1.48	82.12	0.63	0.7	0.76	36.9
North (W_100)	0.9 x	1.4	82.12	0.63	0.7	0.76	34.91
South (W_101)	0.9 x	3.33	114.84	0.63	0.7	0.76	116.11
South (W_102)	0.9 x	0.99	114.84	0.63	0.7	0.76	34.52

SAP 2012 Overheating Assessment

West (W_103) West (W_104) South (W_105)	0.9 x 0.9 x 0.9 x	0.5 0.5 1.46	119.47 119.47 114.84	0.63 0.63 0.63	0.7 0.7 0.7	0.76 0.76 0.76 Total	18.14 18.14 50.91 378.14	(P3/P4)
Internal gains:								
				Jui	ne	July	August	
Internal gains				536	5.13	516.69	525.93	
Total summer gains				932	2.69	894.84	874.48	(P5)
Summer gain/loss ra	ntio			2.6	3	2.52	2.46	(P6)
Mean summer exter	nal tempera	iture (Eas	t Anglia)	15.	4	17.6	17.6	
Thermal mass temper	-			1.3		1.3	1.3	
Threshold temperatu				19.	33	21.42	21.36	(P7)
Likelihood of high		nperature)	No	t significant	Slight	Slight	

Slight

Assessment of likelihood of high internal temperature: