Regulations Compliance Report

 Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.18

 Printed on 08 November 2019 at 12:21:50

 Project Information:

 Assessed By:
 Ross Boulton (STRO028068)

 Building Type:
 Flat

 Dwelling Details:

NEW DWELLING	DESIGN STAGE		Total Floor Area: 74.82m ²					
Site Reference :	B1 Stg 4 Issue		Plot Reference:	B1M-102-05				
Address :	B1M-102-05, Fla	t Type 1-64A, Wimbledon, Londo	on					
Client Details:								
Name:	Galliard Homes							
Address :								
•		within the SAP calculations. ations compliance.						
1a TER and DER	R							
		gas (c), Mains gas (c)						
•	mains gas (c), main		4474 400					
-	oxide Emission Rate Dioxide Emission Ra	. ,	14.71 kg/m² 9.61 kg/m²	OK				
1b TFEE and DF			9.01 kg/m					
	rgy Efficiency (TFE	E)	34.1 kWh/m²					
Dwelling Fabric Er	nergy Efficiency (DF	EE)	35.7 kWh/m ²					
				Fail				
	1.58 kg/m² (04.6 %))						
2 Fabric U-value	S							
Element		Average	Highest					
External	wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK				
Floor Roof		0.13 (max. 0.25) (no roof)	0.13 (max. 0.70)	OK				
Openings	3	(101001) 1.35 (max. 2.00)	1.35 (max. 3.30)	ОК				
2a Thermal brid								
		using user-specified y-value of 0	.15					
3 Air permeabili			-					
Air permeal	pility at 50 pascals		5.00 (design value	9)				
Maximum			10.0	OK				
4 Heating efficie	ency							
Main Heatir	ng system:	Community heating schemes	- mains gas					
Secondary	heating system:	None						
5 Cylinder insul	ation							
Hot water S		No cylinder						
6 Controls	-	-						
Space heat	ing controls	Charging system linked to us		01/				
Hot water c	ontrols:	programmer and at least two	OK					
		No cylinder thermostat						

No cylinder

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7 Low energy lights		
Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK
8 Mechanical ventilation		
Continuous extract system		
Specific fan power:	0.3	
Maximum	0.7	ОК
9 Summertime temperature		
Overheating risk (Thames valley):	Medium	ОК
Based on:		
Overshading:	Average or unknown	
Windows facing: South East	6.96m ²	
Windows facing: South East	2.74m ²	
Windows facing: South East	9.71m ²	
Windows facing: South East	1.59m²	
Ventilation rate:	3.00	
Blinds/curtains:	Light-coloured curtain or r	oller blind
	Closed 100% of daylight h	nours

10 Key features

Community heating, heat from boilers – mains gas Photovoltaic array

Predicted Energy Assessment

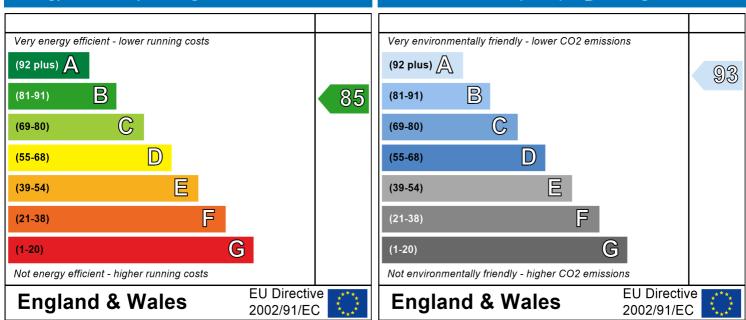
B1M-102-05 Flat Type 1-64A Wimbledon London Dwelling type: Date of assessment: Produced by: Total floor area: Mid floor Flat 01 December 2018 Ross Boulton 74.82 m²

Environmental Impact (CO₂) Rating

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

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

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be. The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.



SAP Input

Property Details: B	IM 102 05												
Address: Located in: Region: UPRN: Date of assessm		Er Tł	B1M-102-05, Flat Type 1-64A, Wimbledon, London England Thames valley 01 December 2018										
Date of certifica Assessment type Transaction type Tenure type: Related party dis Thermal Mass Pa	te: e: e: sclosure:	OS No UI No	3 November 2019 ew dwelling design s ew dwelling nknown o related party ndicative Value Low	stage									
Water use <= 12 PCDF Version:		son/day: 45											
Property description	ו:												
Dwelling type: Detachment: Year Completed:		FI 20	at 018										
Year Completed: Floor Location:			loor area:		Storey height								
Floor 0		74	1.823 m²		2.6 m								
Living area: Front of dwelling f	aces:		4.224 m ² (fraction) orth	0.457)									
Opening types:													
Name: SE_1.36_2.56 x 2 SE_1.07_2.56 x 1 SE_3.72_2.61 x 1 SE_0.62_2.56 x 1	Source: Manufacturer Manufacturer Manufacturer Manufacturer		Type: Windows Windows Windows Windows	low-E, En = low-E, En =	0.05, soft coat 0.05, soft coat 0.05, soft coat 0.05, soft coat	Argon: No No No No	Fram	e:					
Name: SE_1.36_2.56 x 2 SE_1.07_2.56 x 1 SE_3.72_2.61 x 1 SE_0.62_2.56 x 1	Gap: 16mm or 16mm or 16mm or 16mm or	r more r more	Frame Fa 0.8 0.8 0.8 0.8 0.8	ctor: g-value: 0.5 0.5 0.5 0.5 0.5	U-value: 1.35 1.35 1.35 1.35 1.35	Area: 3.48 2.74 9.71 1.59	No. o 2 1 1 1	f Openings:					
Name: SE_1.36_2.56 x 2 SE_1.07_2.56 x 1 SE_3.72_2.61 x 1 SE_0.62_2.56 x 1	Type-Name	2:	Location: Wall Wall Wall Wall	Orient: South East South East South East South East		Width: 1.36 1.07 3.72 0.62	Heigl 2.56 2.56 2.61 2.56	nt:					
Overshading:		Av	verage or unknown										
Opaque Elements:													
External Elements	Gross area:	Opening	-		Ru value:	Curtain	wall:	Kappa:					
Wall Floor <u>Internal Elements</u> <u>Party Elements</u>	56.694 4.95	21	35.69	0.15 0.13	0	False		N/A N/A					

Thermal bridges:

SAP Input

Thermal bridges:	No information on thermal bridging ($y=0.15$) ($y=0.15$)
Ventilation:	
Pressure test: Ventilation:	Yes (As designed) Centralised whole house extract Number of wet rooms: Kitchen + 2 Ductwork: , rigid Approved Installation Scheme: True
Number of chimneys: Number of open flues: Number of fans: Number of passive stacks: Number of sides sheltered: Pressure test: Main heating system:	0 0 0 0 0 3 5
Main heating system:	Community heating schemes Heat source: Community CHP heat from boilers – mains gas, heat fraction 0.666, efficiency 50.4 Heat source: Community boilers heat from boilers – mains gas, heat fraction 0.334, efficiency 95 Piping>=1991, pre-insulated, low temp, variable flow
Main heating Control:	
Main heating Control:	Charging system linked to use of community heating, programmer and at least two room thermostats Control code: 2312
Secondary heating system:	
Secondary heating system: Water heating:	None
Water heating:	From main heating system Water code: 901 Fuel :heat from boilers – mains gas No hot water cylinder Solar panel: False
Others:	
Electricity tariff: In Smoke Control Area: Conservatory: Low energy lights: Terrain type: EPC language: Wind turbine: Photovoltaics:	Standard Tariff Yes No conservatory 100% Dense urban English No <u>Photovoltaic 1</u> Installed Peak power: 0.253 Tilt of collector: 30° Overshading: None or very little Collector Orientation: South West
Assess Zero Carbon Home:	No

User Details:											
Assessor Name:	Ross Boulto	on		Stroma	a Num	ber:		STRO	028068		
Software Name:	Stroma FSA	AP 2012		Softwa	are Ver	sion:		Versio	on: 1.0.4.18		
		F	Property A	Address:	B1M-10)2-05					
Address :		, Flat Type 1-6	4A, Wiml	oledon, L	ondon						
1. Overall dwelling dimer	nsions:										
Ground floor				a(m²) 4.82	(1a) x	Av. He	i ght(m) 6	(2a) =	Volume(m ³) 194.54	(3a)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+(1	n) 7	4.82	(4)			_		_	
Dwelling volume					(3a)+(3b)	+(3c)+(3d)+(3e)+	.(3n) =	194.54	(5)	
2. Ventilation rate:	-	-									
	main heating	seconda heating	ry	other		total			m ³ per hour	•	
Number of chimneys	0	+ 0	+	0] = [0	X 4	40 =	0	(6a)	
Number of open flues	0	+ 0	<u> </u>	0	ī = [0	x 2	20 =	0	(6b)	
Number of intermittent far	IS	J [0	x ^	10 =	0	(7a)	
Number of passive vents					Ē	0	x ^	10 =	0	(7b)	
Number of flueless gas fir	es				Γ	0	x 4	40 =	0	(7c)	
								Air ch	anges per ho	_ ur	
Infiltration due to chimney	c fluos and fa	nc = (6a) + (6b) + (6	7a)±(7h)±(7c) -	Г			1		-	
If a pressurisation test has be					ontinue fro	0 om (9) to (÷ (5) =	0	(8)	
Number of storeys in the							,		0	(9)	
Additional infiltration							[(9)-	-1]x0.1 =	0	(10)	
Structural infiltration: 0.2	25 for steel or	timber frame o	r 0.35 foi	masonr	y constr	uction			0	(11)	
if both types of wall are pre deducting areas of opening			o the great	er wall area	a (after						
If suspended wooden fl).1 (seale	d), else	enter 0				0	(12)	
If no draught lobby, ente	er 0.05, else e	nter 0							0	(13)	
Percentage of windows	and doors dra	aught stripped							0	(14)	
Window infiltration				0.25 - [0.2	x (14) ÷ 1	= [00			0	(15)	
Infiltration rate				(8) + (10) -	+ (11) + (1	2) + (13) +	+ (15) =		0	(16)	
Air permeability value, o			-	•	•	etre of e	nvelope	area	5	(17)	
If based on air permeabilit	•								0.25	(18)	
Air permeability value applies		n test has been do	ne or a deg	gree air per	meability i	is being us	sed				
Number of sides sheltered Shelter factor	1			(20) = 1 - [0.075 x (1	9)] =			3 0.78	(19) (20)	
Infiltration rate incorporation	ng shelter fact	or		(21) = (18)		/-			0.18	(20)	
Infiltration rate modified for	•			· / · /					0.19	_(21)	
i i i	Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Monthly average wind spe	ed from Table	e 7									
<u> </u>	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7			
Wind Factor (22a)m = (22)m ÷ 4	•									
	.23 1.1	1.08 0.95	0.95	0.92	1	1.08	1.12	1.18			

Adjust	ed infiltr	ation rat	e (allowi	ng for sl	nelter an	d wind s	speed) =	: (21a) x	(22a)m				_		
	0.25	0.24	0.24	0.21	0.21	0.18	0.18	0.18	0.19	0.21	0.22	0.23			
		c <i>tive air</i> al ventila	change i	rate for t	he appli	cable ca	se								
				ondix N (2	(26) - (22)		acuation (N5)) , othe	nuico (22h) = (220)			0.		(23a)
		• •	0 11		, (, ,	•	,, .) = (23a)			0.		(23b)
			-	-	-			n Table 4h				(00)	0	1	(23c)
			i	i	i	i	1	HR) (24a	<u> </u>	1	<u> </u>	1) ÷ 100] 1		(24a)
(24a)m=		0	0	0	0	0	0	0	0	0	0	0	J		(24a)
,				1		1	, <u> </u>	MV) (24b	ŕ	r í	<u>, </u>		1		
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0			(24b)
,					•	•		on from c c) = (22b		.5 × (23b))				
(24c)m=	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5]		(24c)
,					•			on from I 0.5 + [(2		0.5]			-		
(24d)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(24d)
Effe	ctive air	change	rate - er	nter (24a) or (24b	o) or (24	c) or (24	ld) in boy	(25)	-		-	-		
(25)m=	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5]		(25)
3 Ho	at losso	e and he	eat loss p	aramet	or:		•	^	•	•	•	•	-		
ELEN		Gros		Openin		Net Ar	·ea	U-valı		AXU		k-value	2	A>	Xk
		area		m		A,r		W/m2		(W/I	K)	kJ/m ² ·		kJ/	
Windo	ws Type	e 1				3.48	x1/	/[1/(1.35)+	+ 0.04] ₌	4.46					(27)
Windo	ws Type	2				2.74		/[1/(1.35)+	+ 0.04] =	3.51	=				(27)
Windo	ws Type	93				9.71		/[1/(1.35)+	+ 0.04] =	12.44	=				(27)
Windo	ws Type	94				1.59		/[1/(1.35)+	• 0.04] =	2.04	=				(27)
Floor	51					4.95		0.13	=	0.6435					(28)
Walls		56.6	69	21		35.69	x	0.15	=	5.35					(29)
Total a	area of e	lements	, m²			61.64	4								(31)
			ows, use e sides of ir				lated using	g formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	h 3.2		
Fabric	heat los	s, W/K	= S (A x	U)				(26)(30)) + (32) =				32	.9	(33)
Heat c	apacity	Cm = S((Axk)						((28)	(30) + (32	2) + (32a)	(32e) =	870	.97	(34)
Therm	al mass	parame	ter (TMF	- Cm -	÷ TFA) ir	n kJ/m²K			Indica	tive Value	: Low		10	0	(35)
	-		ere the de tailed calci		construct	ion are noi	t known pi	recisely the	e indicative	e values of	TMP in T	able 1f			
Therm	al bridge	es : S (L	x Y) cal	culated	using Ap	pendix I	K						9.2	25	(36)
if details	of therma	al bridging	are not kn	own (36) =	= 0.05 x (3	1)									
Total f	abric he	at loss							(33) +	(36) =			42.	14	(37)
Ventila	ation hea	at loss ca	alculated	monthl	y				(38)m	= 0.33 × (25)m x (5)	•		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
(38)m=	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1			(38)
Heat ti	ransfer o	coefficie	nt, W/K						(39)m	= (37) + (3	38)m				
(39)m=	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24			
										Average =	Sum(39)	12 /12=	74.	24	(39)

Heat lo	oss para	meter (H	HLP), W	/m²K					(40)m	= (39)m ÷	· (4)			
(40)m=	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99		
Numb	er of dav	/s in mo	nth (Tab	le 1a)					,	Average =	Sum(40)1.	₁₂ /12=	0.99	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
	L	1		Į	1	Į	I							
4. Wa	ater hea	ting ene	rgy requ	irement:								kWh/ye	ear:	
if TF				: [1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.(0013 x (⁻	TFA -13.		36		(42)
Reduce	the annua	al average	hot water		5% if the c	welling is	designed	(25 x N) to achieve		se target o		.19		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wat	er usage i	n litres pei	r day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)						
(44)m=	99.2	95.6	91.99	88.38	84.77	81.17	81.17	84.77	88.38	91.99	95.6	99.2		
Energy	content of	hot water	used - cai	culated mo	onthly $= 4$.	190 x Vd,r	m x nm x E)))))))))))))))))))			m(44) ₁₁₂ = ables 1b, 1		1082.23	(44)
(45)m=	147.12	128.67	132.78	115.76	111.07	95.85	88.82	101.92	103.13	120.19	131.2	142.48		
lf instan	tanoous u	vator hoati	ng at pain	t of uso (no	hot water	r storago)	ontor 0 in	hovos (16		Total = Su	m(45) ₁₁₂ =	=	1418.98	(45)
			- ·	· ·		1		boxes (46)					l	(40)
(46)m= Water	22.07 storage	19.3 loss:	19.92	17.36	16.66	14.38	13.32	15.29	15.47	18.03	19.68	21.37		(46)
	•) includir	ng any so	olar or W	WHRS	storage	within sa	ame ves	sel		0		(47)
If com	munity ł	neating a	and no ta	ank in dw	velling, e	enter 110) litres in	(47)						
			hot wate	er (this ir	ncludes i	nstantar	neous co	ombi boil	ers) ente	er '0' in (47)			
	storage		odorodi	ana fant	or io kno		dov)						I	(40)
				oss facto	or is kno	wn (kvvr	1/day):					0		(48)
•			m Table					(40) (40)				0		(49)
	•		•	e, kWh/ye cylinder l		or is not		(48) x (49)) =		1	10		(50)
'				rom Tabl							0.	02		(51)
	•	-	ee secti	on 4.3										
		from Ta		0h								03		(52)
			m Table								0	.6		(53)
-		m wateı (54) in (5	-	e, kWh/ye	ear			(47) x (51)) x (52) x (53) =		03 03		(54) (55)
	. ,	. , .	•	for each	month			((56)m = (55) x (41)ı	m	ļ!.	03		(00)
	32.01	28.92	32.01	30.98	32.01	20.00	22.04		30.98	32.01	20.00	22.04	l	(56)
(56)m= If cylind						30.98 x [(50) - (32.01 [H11)] ÷ (5	32.01 0), else (5			30.98 H11) is fro	32.01 m Append	ix H	(30)
(57)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
Prima	y circuit	loss (ar	nnual) fro	om Table	e 3							0		(58)
Prima	ry circuit	loss cal	culated	for each	month (. ,	65 × (41)						
			1		· · · · · ·		r	ng and a	· ·	1	, 	00.00	l	(50)
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)

Combi	loss ca	alculated	for eacl	h month	(61)m =	(60)) ÷ 365 ×	‹ (41)	m						
(61)m=	0	0	0	0	0		0	0	0	0	0	0	0		(61)
Total h	eat req	uired for	water h	neating c	alculated	l for	each m	onth	(62)m =	: 0.85 × ((45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m=	202.39	178.6	188.05	169.25	166.35	14	9.34 14	4.09	157.19	156.63	175.47	184.69	197.75		(62)
Solar DI	-IW input	calculated	using Ap	pendix G o	or Appendix	: H (r	negative qu	uantity	r) (enter '0	' if no sola	r contribu	tion to wate	er heating)		
(add a	dditiona	al lines if	FGHRS	S and/or	WWHRS	ар	plies, se	e App	pendix (G)			-		
(63)m=	0	0	0	0	0		0	0	0	0	0	0	0		(63)
Output	from w	ater hea	ter												
(64)m=	202.39	178.6	188.05	169.25	166.35	14	9.34 14	4.09	157.19	156.63	175.47	184.69	197.75		
									Out	out from wa	ater heate	r (annual)₁	12	2069.82	(64)
Heat g	ains fro	m water	heating	l, kWh/m	onth 0.2	5´[0.85 × (4	45)m	+ (61)n	n] + 0.8 x	د [(46)m	+ (57)m	+ (59)m]	
(65)m=	93.14	82.72	88.37	81.28	81.15	74	1.66 73	3.75	78.11	77.09	84.19	86.42	91.59		(65)
inclu	ide (57)	m in calo	ulation	of (65)n	n only if c	ylin	der is in	the d	welling	or hot w	ater is f	rom com	munity h	eating	
5. Int	ternal q	ains (see	Table	5 and 5a	a):				-				-		
	Ŭ	ns (Table													
metab	Jan	Feb	Mar	Apr	May	Γ.	Jun J	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m=	141.44	141.44	141.44	141.44	141.44			1.44	141.44	141.44	141.44	141.44	141.44		(66)
Lightin	u dains	(calcula	ı ted in A	 .ppendix	L, equat	ion	L9 or L9	a), al	so see	Table 5	I	1			
(67)m=	46.42	41.23	33.53	25.39	18.98			7.31	22.5	30.2	38.35	44.76	47.71		(67)
		1			dix L, eq							_			
(68)m=	310.87	<u>,</u>	305.97	288.66	266.82	r –		2.57	229.34	237.47	254.78	276.62	297.15		(68)
												270.02	207.10		()
(69)m=	51.5	51.5	51.5	51.5	L, equat	-		1.5 1.5	, also si 51.5	51.5	51.5	51.5	51.5		(69)
					51.5	5	1.0 0	1.5	51.5	51.5	51.5	51.5	51.5		(00)
-	r	ins gains	r	<u> </u>		<u> </u>			-					I	(70)
(70)m=	0	0	0	0	0			0	0	0	0	0	0		(70)
			· -	-	ues) (Tab	r	<u> </u>							I	(74)
(71)m=		I	-94.29		-94.29	-9	4.29 -94	4.29	-94.29	-94.29	-94.29	-94.29	-94.29		(71)
	ĭ	gains (T	<u> </u>							1				I	
(72)m=	125.19	123.1	118.78	112.89	109.08	10		9.13	104.99	107.07	113.15	120.03	123.11		(72)
Total i	r	l gains =	:				(66)m +	(67)m	+ (68)m ·	+ (69)m + ((70)m + (7	71)m + (72)	m		
(73)m=	581.12	1	556.92	525.59	493.51	46	4.65 44	7.65	455.47	473.38	504.92	540.05	566.62		(73)
	lar gain														
-			•			and		l equat	tions to co		ie applica	ble orientat	ion.		
Orienta		Access F Table 6d		Area m ²	a		Flux Table (62	т	g_ able 6b	т	FF able 6c		Gains (W)	
0 11	-					г					, 				-
	ast 0.9x	0.77	×	3.	48	×	36.79)	x	0.5		0.8	=	70.99	(77)
	ast <mark>0.9x</mark>	0.77	×	2.	74	×	36.79		x	0.5		0.8	=	27.95	(77)
	ast <mark>0.9x</mark>	0.54	×	9.	71	×	36.79)	x	0.5	_ × [0.8	=	69.45	(77)
	ast <mark>0.9x</mark>	0.77	×	1.	59	×	36.79)	x	0.5	_ × _	0.8	=	16.22	(77)
Southe	ast <mark>0.9x</mark>	0.77	X	3.	48	x	62.67	,	x	0.5	x	0.8	=	120.92	(77)

Southeast 0.ax 0.77 × 2.74 × 0.82 × 0.8 = 47.6 (77) Southeast 0.ax 0.54 × 0.77 × 1.59 × 0.65 × 0.8 = 47.62 (77) Southeast 0.ax 0.77 × 1.59 × 0.55 × 0.8 = 118.3 (77) Southeast 0.ax 0.77 × 2.44 × 68.75 × 0.55 × 0.8 = 165.44 (77) Southeast 0.ax 0.57 × 1.56 × 65.75 × 0.8 = 2.04.9 (77) Southeast 0.ax 0.77 × 1.56 × 106.25 × 0.8 = 2.04.9 (77) Southeast 0.ax 0.77 × 1.58 × 10.52 × 0.8 = 2.04.65 (77) Southeast 0.ax 0.77 × 1.58 × 1.11.	о <i>и</i> . Г		7										-
Southeast 0.4x 0.77 × 1.50 × 0.15 × 0.04 = 27.62 (7) Southeast 0.4x 0.77 × 2.44 × 65.75 × 0.5 × 0.8 = 116.44 (7) Southeast 0.4x 0.54 × 1.58 × 65.75 × 0.55 × 0.8 = 161.87 (7) Southeast 0.4x 0.54 × 1.58 × 0.55 × 0.8 = 0.77.8 (7) Southeast 0.4x 0.77 × 1.48 106.25 × 0.55 × 0.8 = 0.67.7 (7) Southeast 0.4x 0.77 × 1.48 106.25 × 0.55 × 0.8 = 0.20.56 (7) Southeast 0.4x 0.77 × 1.48 × 10.55 × 0.8 = 222.61 (7) Southeast 0.4x 0.77 × 1.48 × 10.55 × 0.8 = 222.61 (7) <	L	0.77	X	2.74	X	62.67	X	0.5	X	0.8	=	47.6	\exists
Southeaslog 0, 0.77 × 0.48 × 0.57 × 0.5 × 0.8 = 0.65.44 (7) Southeaslog 0, 0.77 × 2.74 × 0.57 × 0.5 × 0.8 = 0.65.44 (7) Southeaslog 0, 0.77 × 0.77 × 0.57 × 0.5 × 0.8 = 0.61.87 (7) Southeaslog 0, 0.77 × 0.57 × 0.5 × 0.8 = 0.78 (7) Southeaslog 0, 0.77 × 0.54 × 0.5 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.54 × 0.5 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.5 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.5 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.5 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.5 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.11 × 0.00 (5) × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.00 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.224.65 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.224.65 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.224.65 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.227.66 (7) Southeaslog 0, 0.77 × 0.77 × 0.74 × 0.181.5 × 0.55 × 0.8 = 0.227.67 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.227.67 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.227.67 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.214 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.214 (7) Southeaslog 0, 0.77 × 0.74 × 0.74 × 0.55 × 0.8 = 0.214 (7) Southeaslog 0, 0.77 × 0.74 × 0.439 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.440 × 0.55 × 0.8 = 0.2014 (7) Southeaslog 0, 0.77 × 0.74 × 0.55 × 0.8 = 0.205 (7) Southeaslog 0	L	0.54	x	9.71	x	62.67	x	0.5	X	0.8	=	118.3	(77)
Southeast 0, x 0, 77 x 1, 159 x 0, 162, 5 x 0, 5 x 0, 8 = 161, 97 (7) Southeast 0, x 0, 77 x 1, 159 x 85, 75 x 0, 5 x 0, 8 = 161, 97 (7) Southeast 0, x 0, 77 x 1, 159 x 106, 25 x 0, 5 x 0, 8 = 204, 99 (7) Southeast 0, x 0, 77 x 1, 159 x 106, 25 x 0, 5 x 0, 8 = 200, 56 (7) Southeast 0, x 0, 54 x 9, 71 x 106, 25 x 0, 5 x 0, 8 = 200, 56 (7) Southeast 0, x 0, 54 x 9, 71 x 106, 25 x 0, 5 x 0, 8 = 200, 56 (7) Southeast 0, x 0, 77 x 1, 159 x 106, 25 x 0, 5 x 0, 8 = 200, 56 (7) Southeast 0, x 0, 77 x 1, 159 x 106, 25 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 224, 66 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 01 x 0, 5 x 0, 8 = 222, 76 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 15 x 0, 5 x 0, 8 = 227, 6 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 15 x 0, 5 x 0, 8 = 227, 6 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 15 x 0, 5 x 0, 8 = 221, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 15 x 0, 5 x 0, 8 = 221, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 118, 15 x 0, 5 x 0, 8 = 221, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 113, 17 x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 113, 17 x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 113, 17 x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 113, 17 x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 104, 39 x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 0, 139, 1 x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 0, 143, 174, 174 (7) Southeast 0, x 0, 77 x 1, 159 x 0, 143, 2 (7) x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 0, 143, 2 (7) x 0, 5 x 0, 8 = 739, 77 (7) Southeast 0, x 0, 77 x 1, 159 x 0, 143, 2 (7) x 0	L	0.77	x	1.59	x	62.67	x	0.5	x	0.8	=	27.62	(77)
Southeast 0.9x 0.54 × 0.57 × 0.5 × 0.8 = 161.87 (7) Southeast 0.9x 0.77 × 1.59 × 0.65 × 0.5 × 0.8 = 37.8 (7) Southeast 0.9x 0.77 × 2.74 × 106.25 × 0.5 × 0.8 = 204.99 (7) Southeast 0.9x 0.77 × 2.74 × 106.25 × 0.5 × 0.8 = 200.56 (7) Southeast 0.9x 0.77 × 2.74 × 106.25 × 0.5 × 0.8 = 46.83 (7) Southeast 0.9x 0.77 × 1.59 × 106.25 × 0.5 × 0.8 = 46.83 (7) Southeast 0.9x 0.77 × 1.59 × 106.25 × 0.5 × 0.8 = 46.83 (7) Southeast 0.9x 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 224.61 (7) Southeast 0.9x 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 224.61 (7) Southeast 0.9x 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.9x 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.9x 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.9x 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.9x 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.9x 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 222.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 222.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 222.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 222.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 222.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 222.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 221.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 221.02 (7) Southeast 0.9x 0.77 × 1.59 × 118.14 × 0.5 × 0.8 = 221.02 (7) Southeast 0.9x 0.77 × 1.59 × 113.91 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 104.39 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 104.39 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 104.39 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 104.39 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 0.48 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 0.65 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 0.65 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 0.65 × 0.5 × 0.8 = 216.02 (7) Southeast 0.9x 0.77 × 1.59 × 0.69.7 × 0.5 × 0.8 = 20.50 (7) Southeast 0.9x 0.77 × 1.5	L	0.77	x	3.48	x	85.75	x	0.5	x	0.8	=	165.44	(77)
Southeast 0.9x 0.77 x 1.59 x 85.75 x 0.55 x 0.84 = 37.8 (77) Southeast 0.9x 0.77 x 2.74 x 106.25 x 0.5 x 0.8 = 2004.99 (77) Southeast 0.9x 0.77 x 2.74 x 106.25 x 0.5 x 0.8 = 200.66 (77) Southeast 0.9x 0.77 x 1.59 x 106.25 x 0.5 x 0.8 = 200.66 (77) Southeast 0.9x 0.77 x 3.48 x 119.01 x 0.5 x 0.8 = 202.66 (77) Southeast 0.9x 0.77 x 1.59 x 119.01 x 0.5 x 0.8 = 224.65 (77) Southeast 0.9x 0.77 x 3.48 x 118.15 x 0.5 x 0.8 = 224.65 (77) Southeast 0.9x 0.77 x 3.48	L	0.77	x	2.74	x	85.75	x	0.5	x	0.8	=	65.13	(77)
Southeast 0.sx 0.77 x 3.48 x 1162.25 x 0.5 x 0.8 = 204.99 (7) Southeast 0.sx 0.77 x 2.74 x 1166.25 x 0.5 x 0.8 = 200.56 (7) Southeast 0.sx 0.77 x 1.59 x 106.25 x 0.5 x 0.8 = 200.56 (7) Southeast 0.sx 0.77 x 1.59 x 119.01 x 0.5 x 0.8 = 229.61 (7) Southeast 0.sx 0.77 x 2.74 x 119.01 x 0.5 x 0.8 = 229.61 (7) Southeast 0.sx 0.77 x 2.74 x 118.01 x 0.5 x 0.8 = 229.67 (7) Southeast 0.sx 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 229.67 (7) Southeast 0.sx 0.77 x 2.74 x	Southeast 0.9x	0.54	x	9.71	x	85.75	x	0.5	x	0.8	=	161.87	(77)
Southeast 0.5x 0.77 × 2.74 × 106.25 × 0.5 × 0.8 = 0.07 (7) Southeast 0.5x 0.54 × 0.77 × 159 × 106.25 × 0.5 × 0.8 = 200.66 (7) Southeast 0.5x 0.77 × 1.59 × 106.25 × 0.5 × 0.8 = 220.66 (7) Southeast 0.5x 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.5x 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 227.85 (7) Southeast 0.5x 0.77 × 3.48 × 118.15 × 0.5 × 0.8 = 227.95 (7) Southeast 0.5x 0.77 × 1.59 × 118.15 × 0.5 ×	Southeast 0.9x	0.77	x	1.59	x	85.75	x	0.5	x	0.8	=	37.8	(77)
Southeast 0.5k 0.54 x 0.71 x 106.25 x 0.5 x 0.8 = 200.56 (7) Southeast 0.5k 0.77 x 1.59 x 106.25 x 0.5 x 0.8 = 200.56 (7) Southeast 0.5k 0.77 x 2.74 x 119.01 x 0.55 x 0.88 = 229.61 (7) Southeast 0.5k 0.65 x 0.81 = 224.65 (7) Southeast 0.5k 0.65 x 0.88 = 52.45 (7) Southeast 0.5k 0.77 x 1.48 x 118.15 x 0.5 x 0.88 = 223.02 (7) Southeast 0.5k 0.64 x 9.71 x 118.15 x 0.5 x 0.88 = 22.3.02 (7) Southeast 0.5k 0.77 x 1.56 x 113.91 x 0.5 x 0.88 = 2.2.07 (7) Southeast 0.5k 0.	Southeast 0.9x	0.77	x	3.48	x	106.25	x	0.5	x	0.8	=	204.99	(77)
Southeast 0.5k 0.77 x 1.59 x 106.25 x 0.5 x 0.8 = 46.63 (77) Southeast 0.5k 0.77 x 3.48 x 119.01 x 0.5 x 0.8 = 229.61 (77) Southeast 0.5k 0.64 x 9.71 x 119.01 x 0.5 x 0.8 = 229.61 (77) Southeast 0.5k 0.64 x 9.71 x 119.01 x 0.5 x 0.88 = 229.65 (77) Southeast 0.5k 0.77 x 1.59 x 118.15 x 0.5 x 0.88 = 227.95 (77) Southeast 0.5k 0.77 x 1.58 x 118.15 x 0.5 x 0.88 = 22.02 (77) Southeast 0.5k 0.77 x 1.58 x 113.91 x 0.5 x 0.88 = 21.07 (77) Southeast 0.5k 0.77 x 1.58	Southeast 0.9x	0.77	x	2.74	x	106.25	x	0.5	x	0.8	=	80.7	(77)
Southeast 0.9k 0.77 x 3.48 x 119.01 x 0.65 x 0.8 = 229.61 (7) Southeast 0.9k 0.77 x 2.74 x 119.01 x 0.55 x 0.8 = 90.39 (77) Southeast 0.9k 0.54 x 9.71 x 119.01 x 0.55 x 0.8 = 224.65 (77) Southeast 0.9k 0.77 x 1.59 x 119.01 x 0.55 x 0.8 = 227.95 (77) Southeast 0.9k 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.95 (77) Southeast 0.9k 0.77 x 1.59 x 118.15 x 0.5 x 0.8 = 221.07 (77) Southeast 0.9k 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 201.4 (77) Southeast 0.9k 0.77 x 1.59	Southeast 0.9x	0.54	x	9.71	x	106.25	x	0.5	x	0.8	=	200.56	(77)
Southeast 0.9x 0.77 x 2.74 x 119.01 x 0.55 x 0.8 = 90.39 (7) Southeast 0.9x 0.54 x 9.71 x 119.01 x 0.55 x 0.8 = 224.65 (7) Southeast 0.9x 0.77 x 3.48 x 118.15 x 0.55 x 0.8 = 227.95 (7) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.55 x 0.8 = 227.95 (7) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 3.48 x 113.91 x 0.5 x 0.8 = 227.02 (7) Southeast 0.9x 0.77 x 3.48 x 113.91 x 0.5 x 0.8 = 219.07 (7) Southeast 0.9x 0.77 x 3.48	Southeast 0.9x	0.77	x	1.59	x	106.25	x	0.5	x	0.8	=	46.83	(77)
Southeast 0.9x 0.54 x 9.71 x 119.01 x 0.5 x 0.8 = 224.65 (77) Southeast 0.9x 0.77 x 1.59 x 119.01 x 0.5 x 0.8 = 227.96 (77) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.96 (77) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.96 (77) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 2219.77 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 219.77 (77) Southeast 0.9x 0.77 x 2.74	Southeast 0.9x	0.77	x	3.48	x	119.01	x	0.5	x	0.8	=	229.61	(77)
Southeast 0.9x0.77x1.59x119.01x0.5x0.08=62.46(77)Southeast 0.9x0.77x3.48x1118.15x0.5x0.8=227.95(77)Southeast 0.9x0.54x9.71x118.15x0.5x0.8=223.02(77)Southeast 0.9x0.54x9.71x118.15x0.5x0.8=223.02(77)Southeast 0.9x0.77x1.59x118.15x0.5x0.8=223.02(77)Southeast 0.9x0.77x3.48x113.91x0.5x0.8=223.02(77)Southeast 0.9x0.77x2.74x113.91x0.5x0.8=215.02(77)Southeast 0.9x0.77x1.59x113.91x0.5x0.8=216.21(77)Southeast 0.9x0.77x1.59x114.39x0.5x0.8=216.21(77)Southeast 0.9x0.77x1.59x104.39x0.5x0.8=216.21(77)Southeast 0.9x0.77x1.59x104.39x0.5x0.8=179.29(77)Southeast 0.9x0.77x1.59x104.39x0.5<	Southeast 0.9x	0.77	x	2.74	x	119.01	x	0.5	x	0.8	=	90.39	(77)
Southeast 0,ax 0.77 x 3.48 x 118.15 x 0.5 x 0.8 = 227.95 (77) Southeast 0,ax 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.95 (77) Southeast 0,ax 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 227.95 (77) Southeast 0,ax 0.77 x 1.59 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0,ax 0.77 x 3.48 x 113.91 x 0.5 x 0.8 = 219.77 (77) Southeast 0,ax 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 215.02 (77) Southeast 0,ax 0.77 x 1.59 x 114.39 x 0.5 x 0.8 = 215.02 (77) Southeast 0,ax 0.77 x 2.74	Southeast 0.9x	0.54	x	9.71	x	119.01	x	0.5	x	0.8	=	224.65	(77)
Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 99.74 (7) Southeast 0.9x 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 219.77 (77) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 201.4 (77) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 1.59 x<	Southeast 0.9x	0.77	x	1.59	x	119.01	x	0.5	x	0.8	=	52.45	(77)
Southeast 0.9x 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.55 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 3.48 x 113.91 x 0.5 x 0.8 = 219.77 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 215.02 (77) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 215.02 (77) Southeast 0.9x 0.77 x 3.48 x 104.39 x 0.5 x 0.8 = 201.4 (77) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 107.05 (77) Southeast 0.9x 0.77 x 1.59 <t< td=""><td>Southeast 0.9x</td><td>0.77</td><td>x</td><td>3.48</td><td>x</td><td>118.15</td><td>x</td><td>0.5</td><td>x</td><td>0.8</td><td>=</td><td>227.95</td><td>(77)</td></t<>	Southeast 0.9x	0.77	x	3.48	x	118.15	x	0.5	x	0.8	=	227.95	(77)
Southeast 0.94 ORSoutheast 0.94 ORSoutheast 0.94 ORSoutheast 0.94 ORSoutheast 0.94 Southeast 0.94 S	Southeast 0.9x	0.77	x	2.74	x	118.15	x	0.5	x	0.8	=	89.74	(77)
Southeast $0.9*$ 0.77x3.48x113.91x0.5x0.8=219.7777Southeast $0.9*$ 0.77x2.74x113.91x0.5x0.8=86.5277Southeast $0.9*$ 0.54x9.71x113.91x0.5x0.8=219.7777Southeast $0.9*$ 0.54x9.71x113.91x0.5x0.8=201.277Southeast $0.9*$ 0.77x1.59x113.91x0.5x0.8=201.477Southeast $0.9*$ 0.77x3.48x104.39x0.5x0.8=201.477Southeast $0.9*$ 0.77x2.74x104.39x0.5x0.8=79.2977Southeast $0.9*$ 0.77x2.74x104.39x0.5x0.8=197.0577Southeast $0.9*$ 0.77x1.59x104.39x0.5x0.8=179.1477Southeast $0.9*$ 0.77x3.48x92.85x0.5x0.8=175.2777Southeast $0.9*$ 0.77x2.74x92.85x0.5x0.8=175.2777Southeast $0.9*$ 0.77x1.59x92.85x0.5x <td>Southeast 0.9x</td> <td>0.54</td> <td>x</td> <td>9.71</td> <td>x</td> <td>118.15</td> <td>x</td> <td>0.5</td> <td>x</td> <td>0.8</td> <td>=</td> <td>223.02</td> <td>(77)</td>	Southeast 0.9x	0.54	x	9.71	x	118.15	x	0.5	x	0.8	=	223.02	(77)
Southeast $0.9x$ 0.77 x 2.74 x 113.91 x 0.5 x 0.8 $=$ 86.52 (77) Southeast $0.9x$ 0.54 x 9.71 x 113.91 x 0.5 x 0.8 $=$ 215.02 (77) Southeast $0.9x$ 0.77 x 1.59 x 113.91 x 0.5 x 0.8 $=$ 50.21 (77) Southeast $0.9x$ 0.77 x 3.48 x 104.39 x 0.5 x 0.8 $=$ 201.4 (77) Southeast $0.9x$ 0.77 x 2.74 x 104.39 x 0.5 x 0.8 $=$ 79.29 (77) Southeast $0.9x$ 0.77 x 2.74 x 104.39 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 3.48 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0	Southeast 0.9x	0.77	x	1.59	x	118.15	x	0.5	x	0.8	=	52.07	(77)
Southeast 0.9x 0.54 x 9.71 x 113.91 x 0.5 x 0.8 = 215.02 (77) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 50.21 (77) Southeast 0.9x 0.77 x 3.48 x 104.39 x 0.5 x 0.8 = 50.21 (77) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 79.29 (77) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 179.14 (77) Southeast 0.9x 0.77 x 2.74 <td< td=""><td>Southeast 0.9x</td><td>0.77</td><td>x</td><td>3.48</td><td>x</td><td>113.91</td><td>x</td><td>0.5</td><td>x</td><td>0.8</td><td>=</td><td>219.77</td><td>(77)</td></td<>	Southeast 0.9x	0.77	x	3.48	x	113.91	x	0.5	x	0.8	=	219.77	(77)
Southeast $0.9x$ 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 50.21 (77) Southeast $0.9x$ 0.77 x 3.48 x 104.39 x 0.5 x 0.8 = 201.4 (77) Southeast $0.9x$ 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 79.29 (77) Southeast $0.9x$ 0.54 x 9.71 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 3.48 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 = 135.47 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8	Southeast 0.9x	0.77	x	2.74	x	113.91	x	0.5	x	0.8	=	86.52	(77)
Southeast 0.9x 0.77 x 3.48 x 104.39 x 0.5 x 0.8 = 201.4 (77) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 79.29 (77) Southeast 0.9x 0.54 x 9.71 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 3.48 x 92.85 x 0.5 x 0.8 = 179.14 (77) Southeast 0.9x 0.77 x 2.74 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast 0.9x 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast 0.9x 0.77 x 1.59 y	Southeast 0.9x	0.54	x	9.71	x	113.91	x	0.5	x	0.8	=	215.02	(77)
Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 79.29 (77) Southeast 0.9x 0.54 x 9.71 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast 0.9x 0.77 x 3.48 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast 0.9x 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast 0.9x 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 133.64 (77) Southeast 0.9x 0.77 x 2.74	Southeast 0.9x	0.77	x	1.59	x	113.91	x	0.5	x	0.8	=	50.21	(77)
Southeast $0.9x$ 0.54 x 9.71 x 104.39 x 0.5 x 0.8 $=$ 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 $=$ 46.01 (77) Southeast $0.9x$ 0.77 x 3.48 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 33.61 (77) Southeast $0.9x$ 0.7	Southeast 0.9x	0.77	x	3.48	x	104.39	x	0.5	x	0.8	=	201.4	(77)
Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 46.01 (77) Southeast $0.9x$ 0.77 x 3.48 x 92.85 x 0.5 x 0.8 = 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 = 70.52 (77) Southeast $0.9x$ 0.77 x 9.71 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 140.92 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 13.64 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 =	Southeast 0.9x	0.77	x	2.74	x	104.39	x	0.5	x	0.8	=	79.29	(77)
Southeast $0.9x$ 0.77 x 3.48 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 70.52 (77) Southeast $0.9x$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 $=$ 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 30.53 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 30.53 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.77	Southeast 0.9x	0.54	x	9.71	x	104.39	x	0.5	x	0.8	=	197.05	(77)
Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 70.52 (77) Southeast $0.9x$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 $=$ 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 33.64 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 33.63 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.54 <td>Southeast 0.9x</td> <td>0.77</td> <td>x</td> <td>1.59</td> <td>x</td> <td>104.39</td> <td>x</td> <td>0.5</td> <td>x</td> <td>0.8</td> <td>=</td> <td>46.01</td> <td>(77)</td>	Southeast 0.9x	0.77	x	1.59	x	104.39	x	0.5	x	0.8	=	46.01	(77)
Southeast $0.9x$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 $=$ 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 33.64 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 33.63 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 $=$ 9.1942 (77) Southeast $0.9x$ 0.77	Southeast 0.9x	0.77	x	3.48	x	92.85	x	0.5	x	0.8	=	179.14	(77)
Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x <t< td=""><td>Southeast 0.9x</td><td>0.77</td><td>x</td><td>2.74</td><td>x</td><td>92.85</td><td>x</td><td>0.5</td><td>x</td><td>0.8</td><td>=</td><td>70.52</td><td>(77)</td></t<>	Southeast 0.9x	0.77	x	2.74	x	92.85	x	0.5	x	0.8	=	70.52	(77)
Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 31.49 x 0.5 x 0.8 = 60.75	Southeast 0.9x	0.54	x	9.71	x	92.85	x	0.5	x	0.8	=	175.27	(77)
OutputSoutheast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 $=$ 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x	Southeast 0.9x	0.77	x	1.59	x	92.85	x	0.5	x	0.8	=	40.92	(77)
Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	3.48	x	69.27	x	0.5	x	0.8	=	133.64	(77)
Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 83.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	2.74	x	69.27	x	0.5	x	0.8	=	52.61	(77)
Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.54	x	9.71	x	69.27	x	0.5	x	0.8	=	130.75	(77)
Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	1.59	x	69.27	x	0.5	x	0.8	=	30.53	(77)
Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	3.48	x	44.07	x	0.5	x	0.8	=	85.03	(77)
Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	2.74	×	44.07	x	0.5	x	0.8	=	33.47	(77)
Southeast $_{0.9x}$ $_{0.77}$ x $_{3.48}$ x $_{31.49}$ x $_{0.5}$ x $_{0.8}$ = $_{60.75}$ (77)	Southeast 0.9x	0.54	x	9.71	×	44.07	x	0.5	x	0.8	=	83.19	(77)
	Southeast 0.9x	0.77	x	1.59	×	44.07	x	0.5	x	0.8	=	19.42	(77)
Southeast $0.9x$ 0.77 x 2.74 x 31.49 x 0.5 x 0.8 = 23.92 (77)	L	0.77	x	3.48	×	31.49	x	0.5	x	0.8	=	60.75	(77)
	Southeast 0.9x	0.77	x	2.74	x	31.49	x	0.5	x	0.8	=	23.92	(77)

Southeast 0.	9x 0.54	×	9.7	71	x 🖂	31.49] × [0.5	┐ × Г	0.8	=	59.44	(77)
Southeast 0.						31.49	;		듹				(77)
oouncast _{0.}	0.77 0.77	X	1.5	99	x 3	51.49	×	0.5	×	0.8	=	13.88	((7)
Color going	in watta a		6	h			(00)	(74)	(00)				
Solar gains		430.24	533.09	597.1	592.78	571.51	(83)m = 3 523.75	um(74)m . 465.86	347.53	221.11	157.98		(83)
Total gains							020.70	400.00	047.00	221.11	107.00		()
(84)m= 765	-	987.16	1058.67	1090.62	· ,		979.22	939.24	852.45	761.16	724.6		(84)
		I		I		1010.10	010.22	300.24	002.40	/01.10	724.0		(0.)
	ternal tem												
-	ure during l				-		ole 9, Th	1 (°C)				21	(85)
Utilisation	factor for g	ains for	iving are	ea, h1,m	(see Ta	ble 9a)	i					I	
Ja	n Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(86)m= 0.8	9 0.84	0.77	0.68	0.56	0.42	0.31	0.34	0.5	0.7	0.84	0.9		(86)
Mean inte	rnal tempe	rature in	living ar	ea T1 (fo	ollow ste	ps 3 to 7	in Tabl	e 9c)					
(87)m= 19.	58 19.87	20.21	20.54	20.79	20.93	20.98	20.97	20.89	20.56	20.01	19.5		(87)
Temperati	ure during I	Deating r	eriods ir	n rest of	dwelling	from Ta	hle 9 T	• h2 (°ር)					
(88)m= 20.0		20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09		(88)
												I	
	factor for g			<u> </u>	,	1			0.07	0.00	0.00		(90)
(89)m= 0.8	7 0.82	0.75	0.65	0.52	0.37	0.25	0.27	0.44	0.67	0.82	0.89		(89)
Mean inte	rnal tempe	rature in	the rest	of dwelli	ng T2 (f	ollow ste	eps 3 to	7 in Tabl	e 9c)				
(90)m= 18.2	23 18.63	19.09	19.55	19.87	20.03	20.08	20.07	19.98	19.59	18.84	18.1		(90)
								1	iLA = Livin	g area ÷ (4	4) =	0.46	(91)
Mean inte	rnal tempe	rature (fo	r the wh	ole dwe	lling) = f	LA × T1	+ (1 – fl	_A) × T2					
(92)m= 18.		19.6	20	20.29	20.44	20.49	20.48	20.4	20.03	19.37	18.74		(92)
Apply adju	stment to t	he mear	interna	l temper	ature fro	m Table	4e, whe	ere appro	opriate	1			
(93)m= 18.8		19.6	20	20.29	20.44	20.49	20.48	20.4	20.03	19.37	18.74		(93)
8. Space I	neating req	uirement						1					
	ne mean in			re obtain	ed at st	ep 11 of	Table 9	b, so tha	t Ti,m=(76)m an	d re-calc	ulate	
the utilisat	ion factor f	or gains	using Ta	able 9a		-							
Ja	n Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	factor for g	jains, hm	:							1		1	
(94)m= 0.8	5 0.8	0.74	0.64	0.53	0.39	0.28	0.3	0.46	0.66	0.8	0.87		(94)
	ns, hmGm	, W = (94	, <u>,</u>	<u> </u>								I	
(95)m= 652		726.45	680.62	572.64	413.09	283.08	295.79	433.32	566.73	611.86	627.92		(95)
	verage exte	i i	·	r			i					I	
(96)m= 4.3		6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
	rate for me	1		i		<u> </u>	<u> </u>	n <u>í</u>				1	
	.98 1061.23		824.28	637.68	433.61	288.68	303.13	467.38	700.43	911.19	1079.53		(97)
	ating requir	1		r		1		í Ì	í - ·	ŕ		1	
(98)m= 317	93 232.65	183.28	103.43	48.39	0	0	0	0	99.47	215.51	336		
							Tota	al per year	(kWh/yeai	⁻) = Sum(9	8)15,912 =	1536.66	(98)
Space hea	ating requir	ement in	kWh/m²	²/year								20.54	(99)
9b. Energy	requi <u>reme</u> i	nts – Cor	nmunity	heating	scheme								_

This part is used for space heating, space cooling or water heating provided by a community scheme.

Fraction of space heat from secondary/supplementary heating (Table 11) '0' if none	0	(301)
Fraction of space heat from community system $1 - (301) =$		1](302)
The community scheme may obtain heat from several sources. The procedure a includes boilers, heat pumps, geothermal and waste heat from power stations.		he latter], ,
Fraction of heat from Community CHP		0.67	(303a)
Fraction of community heat from heat source 2		0.33	(303b)
Fraction of total space heat from Community CHP	(302) x (303a) =	0.67	(304a)
Fraction of total space heat from community heat source 2	(302) x (303b) =	0.33	(304b)
Factor for control and charging method (Table 4c(3)) for commu	nity heating system	1	(305)
Distribution loss factor (Table 12c) for community heating system	n	1.05	(306)
Space heating Annual space heating requirement		kWh/year 1536.66]
Space heat from Community CHP	(98) x (304a) x (305) x (306) =	1074.58	(307a)
Space heat from heat source 2	(98) x (304b) x (305) x (306) =	538.91	(307b)
Efficiency of secondary/supplementary heating system in % (from	m Table 4a or Appendix E)	0	(308
Space heating requirement from secondary/supplementary syste	em (98) x (301) x 100 ÷ (308) =	0	(309)
Water heating Annual water heating requirement If DHW from community scheme:		2069.82]
Water heat from Community CHP	(64) x (303a) x (305) x (306) =	1447.42	(310a)
Water heat from heat source 2	(64) x (303b) x (305) x (306) =	725.89	(310b)
Electricity used for heat distribution	0.01 × [(307a)(307e) + (310a)(310e)] =	37.87	(313)
Cooling System Energy Efficiency Ratio		0	(314)
Space cooling (if there is a fixed cooling system, if not enter 0)	= (107) ÷ (314) =	0	(315)
Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from	outside	92.56	(330a)
warm air heating system fans		0	(330b)
pump for solar water heating		0	(330g)
Total electricity for the above, kWh/year	=(330a) + (330b) + (330g) =	92.56	(331)
Energy for lighting (calculated in Appendix L)		327.93	(332)
Electricity generated by PVs (Appendix M) (negative quantity)		-208.31	(333)
Electricity generated by wind turbine (Appendix M) (negative qua	antity)	0	(334)
10b. Fuel costs – Community heating scheme			
Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year	
Space heating from CHP (307a) x	3.35 × 0.01 =	36	(340a)

(307b) x

Space heating from heat source 2

(340b)

25.81

x 0.01 =

4.79

Water heating from CHP	(310a) x		3.35	x 0.01 =	48.49	(342a)
Water heating from heat source 2	(310b) x	Г	4.79	x 0.01 =	34.77	(342b)
		Fu	uel Price	_		_
Pumps and fans	(331)		0	x 0.01 =	16.25	(349)
Energy for lighting	(332)		0	x 0.01 =	57.58	(350)
Additional standing charges (Table	12)			[88	(351)
Energy saving/generation technolog	gies = (340a)(342e) + (345)	.(354) =		Γ	306.91	(355)
11b. SAP rating - Community heat	ing scheme			-		
Energy cost deflator (Table 12)				Г	0.42	(356)
Energy cost factor (ECF)	[(355) x (356)] ÷ [(4) + 45.0] =		ſ	1.07	(357)
SAP rating (section12)				Ī	85.14	(358)
12b. CO2 Emissions – Community	heating scheme					
Electrical efficiency of CHP unit				[32	(361)
Heat efficiency of CHP unit				[50.4	(362)
		Energy kWh/year	Emissior kg CO2/k		Emissions kg CO2/year	
Space heating from CHP)	(307a) × 100 ÷ (362) =	2132.11 ×	0.22		460.54	(363)
less credit emissions for electricity	-(307a) × (361) ÷ (362) =	682.28 ×	0.52		-354.1	(364)
Water heated by CHP	(310a) × 100 ÷ (362) =	2871.87 ×	0.22		620.32	(365)
less credit emissions for electricity	-(310a) × (361) ÷ (362) =	919 ×	0.52		-476.96	(366)
Efficiency of heat source 2 (%)	If there is CHP using	ng two fuels repeat (363)	to (366) for the s	second fuel	95	(367b)
CO2 associated with heat source 2	[(307b)	+(310b)] x 100 ÷ (367b) x	0.22	=	287.57	(368)
Electrical energy for heat distributio	n	[(313) x	0.52	=	19.65	(372)
Total CO2 associated with commun	iity systems	(363)(366) + (368)(3	372)	=	557.03	(373)
CO2 associated with space heating	(secondary)	(309) x	0	=	0	(374)
CO2 associated with water from imi	mersion heater or instantan	eous heater (312) x	0.22	=	0	(375)
Total CO2 associated with space an	nd water heating	(373) + (374) + (375) =			557.03	(376)
CO2 associated with electricity for p	oumps and fans within dwel	ling (331)) x	0.52	=	48.04	(378)
CO2 associated with electricity for l	ighting	(332))) x	0.52	=	170.19	(379)
Energy saving/generation technolog	gies (333) to (334) as applic	cable	0.52	x 0.01 =	-108.11	(380)
Total CO2, kg/year	sum of (376)(382) =			ſ	667.15	(383)
Dwelling CO2 Emission Rat	(383) ÷ (4) =			L [8.92	(384)
El rating (section 14)				ſ	92.54	(385)
13b. Primary Energy – Community	heating scheme			-		
Electrical efficiency of CHP unit				[32	(361)

Heat efficiency of CHP unit						50.4	(362)
		Energy kWh/year		rimary actor		Energy /h/year	
Space heating from CHP)	(307a) × 100 ÷ (362) =	2132.11	×	1.22] [2601.18	(363)
less credit emissions for electricity	-(307a) × (361) ÷ (362) =	682.28	x	3.07] [-2094.59	(364)
Water heated by CHP	(310a) × 100 ÷ (362) =	2871.87	×	1.22] [3503.68	(365)
less credit emissions for electricity	-(310a) × (361) ÷ (362) =	919	×	3.07] [-2821.33	(366)
Efficiency of heat source 2 (%)	If there is CHF	P using two fuels repeat (36	63) to (36	6) for the secor	nd fuel	95	(367b)
Energy associated with heat source	2 [(3	07b)+(310b)] x 100 ÷ (367b	b) x	1.22] = [1624.26	(368)
Electrical energy for heat distributio	n	[(313) x] = [116.25	(372)
Total Energy associated with comm	nunity systems	(363)(366) + (368)	(372)		=	2929.46	(373)
if it is negative set (373) to zero (unless specified otherw	ise, see C7 in Append	dix C)		[2929.46	(373)
Energy associated with space heati	ng (secondary)	(309) x		0] = [0	(374)
Energy associated with water from	immersion heater or ins	tantaneous heater(312	2) x	1.22] = [0	(375)
Total Energy associated with space	and water heating	(373) + (374) + (375)	=		[2929.46	(376)
Energy associated with space cooli	ng	(315) x	Γ	3.07] = [0	(377)
Energy associated with electricity for	or pumps and fans withi	n dwelling (33	1)) x	3.07] = [284.17	(378)
Energy associated with electricity for	or lighting	(332))) x		3.07] = [1006.73	(379)
Energy saving/generation technolog	gies		3.0)7 × 0.	01 =	-639.5	(380)
Total Primary Energy, kWh/	year sum of (376)(382) =				3580.85	(383)

			User D	etails:						
Assessor Name: Software Name:	Ross Boulto Stroma FSA			Stroma Softwa					028068 on: 1.0.4.18	
				Address:)2-05				
Address :		Flat Type 1-64	A, Wimb	oledon, L	ondon					
1. Overall dwelling dimer	nsions:			()						
Ground floor				a(m²) 4.82	(1a) x	Av. Hei	ight(m) 6	(2a) =	Volume(m ³) 194.54	(3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1	d)+(1e)+(1r	1) 7	4.82	(4)					
Dwelling volume					(3a)+(3b)	+(3c)+(3d)+(3e)+	.(3n) =	194.54	(5)
2. Ventilation rate:		1-				4 - 4 - 1				
Number of chimneys Number of open flues	main heating	secondar heating + 0 + 0	y] + [] + [0] = [total 0		40 = 20 =	m ³ per hour	(6a)
·	0	+ 0	」 · ∟	0	┘╴└	0			0	(6b)
Number of intermittent far	IS					3	x ?	10 =	30	(7a)
Number of passive vents						0	x ′	10 =	0	(7b)
Number of flueless gas fir	es					0	x 4	40 =	0	(7c)
								Air ch	anges per ho	ur
Infiltration due to chimney If a pressurisation test has be	-				continue fro	30 om (9) to (÷ (5) =	0.15	(8)
Number of storeys in th	e dwelling (ns)								0	(9)
Additional infiltration							[(9)-	-1]x0.1 =	0	(10)
Structural infiltration: 0.2 if both types of wall are pre deducting areas of opening	esent, use the valu gs); if equal user 0.	e corresponding to .35	o the great	er wall area	a (after	uction			0	(11)
If suspended wooden fle	oor, enter 0.2 (unsealed) or 0	.1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, ente									0	(13)
Percentage of windows	and doors dra	ught stripped		0.05 10.0		0.01			0	(14)
Window infiltration				0.25 - [0.2		-	(45)		0	(15)
Infiltration rate Air permeability value, o		Lin oubio motro		(8) + (10) ·				oroo	0	(16)
If based on air permeabilit					•		nvelope	alea	5	(17) (18)
Air permeability value applies						is being us	sed		0.4	
Number of sides sheltered						0			3	(19)
Shelter factor				(20) = 1 - [0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporation	ng shelter facto	or		(21) = (18)	x (20) =				0.31	(21)
Infiltration rate modified for	r monthly wind	speed								
Jan Feb I	Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spe	ed from Table	7								
(22)m= 5.1 5	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (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		

Adjust	ed infiltra	ation rat	e (allowi	ng for sł	nelter an	d wind s	peed) =	(21a) x	(22a)m				_		
	0.4	0.39	0.38	0.34	0.34	0.3	0.3	0.29	0.31	0.34	0.35	0.37			
	<i>ate effec</i> echanica		-	rate for t	he appli	cable ca	se								(220)
				andix N (2	3h) - (23a	a) x Emv (e	equation (N	N5)) , othei	rwise (23h) – (23a)				0	(23a)
								n Table 4h)) = (200)				0	(23b)
			-	-	-) b) m i (22h) v [1 – (23c)		0	(23c)
a) II (24a)m=									$0^{111} = (22)^{111}$	$\frac{20}{0}$ (1)	230) × [$\frac{1-(230)}{0}$) - 100]]		(24a)
		-	-	÷	-	÷	-	Ţ	÷	-	Ŭ	0	J		(210)
D) II (24b)m=								VV) (24b	0)m = (22)	$\frac{1}{2} \frac{1}{2} \frac{1}$	230)	0	1		(24b)
					-					0	0	0	J		(240)
,					•	•		on from c c) = (22b		5 × (23b)				
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0			(24c)
,					•			on from l 0.5 + [(2		0.5]					
(24d)m=	0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57]		(24d)
Effe	ctive air	change	rate - er	nter (24a) or (24t	o) or (24	c) or (24	d) in boy	x (25)				-		
(25)m=	0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57]		(25)
3 He	at losse	s and he	at loss i	paramet	⊃r.								-		
ELEN		Gros		Openin		Net Ar	ea	U-valı	le	AXU		k-value	-	A :	Xk
		area		n		A ,r		W/m2		(W/I	≺)	kJ/m²·l		kJ/	
Windo	ws Type	e 1				3.1	x1.	/[1/(1.4)+	0.04] =	4.11					(27)
Windo	ws Type	2				2.44	x1.	/[1/(1.4)+	0.04] =	3.23					(27)
Windo	ws Type	3				8.65	x1.	/[1/(1.4)+	0.04] =	11.47					(27)
Windo	ws Type	e 4				1.42	x1.	/[1/(1.4)+	0.04] =	1.88	=				(27)
Floor						4.95	×	0.13] = [0.6435	= 1				(28)
Walls		56.6	69	18.7	1	37.98	X	0.18	; = [6.84	i F				(29)
Total a	area of e	lements	, m²			61.64			L						(31)
				effective wi nternal wal		alue calcul		g formula 1,	/[(1/U-valu	e)+0.04] a	ns given in	paragraph	h 3.2		
Fabric	heat los	s, W/K :	= S (A x	U)				(26)(30)	+ (32) =				3	2.29	(33)
Heat c	apacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a)	(32e) =	90	03.03	(34)
Therm	al mass	parame	ter (TMF	⁻ = Cm -	- TFA) ir	n kJ/m²K			Indica	tive Value	: Medium			250	(35)
	-		ere the de tailed calc		construct	ion are noi	t known pr	recisely the	e indicative	values of	TMP in T	able 1f			
Therm	al bridge	es : S (L	x Y) cal	culated	using Ap	pendix l	<						3	3.08	(36)
if details	s of therma	al bridging	are not kn	own (36) =	= 0.05 x (3	1)									
Total f	abric he	at loss							(33) +	(36) =			3	5.37	(37)
Ventila	ation hea	at loss ca	alculated	monthl	/				(38)m	= 0.33 × (25)m x (5)	•		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
(38)m=	37.22	37.02	36.83	35.91	35.74	34.94	34.94	34.79	35.25	35.74	36.09	36.45			(38)
Heat ti	ransfer c	coefficie	nt, W/K						(39)m	= (37) + (3	38)m		_		
(39)m=	72.59	72.39	72.19	71.28	71.11	70.31	70.31	70.16	70.62	71.11	71.45	71.82			
									/	Average =	Sum(39)	12 /12=	7	1.28	(39)

Heat lo	oss para	meter (H	HLP), W	/m²K					(40)m	= (39)m ÷	- (4)			
(40)m=	0.97	0.97	0.96	0.95	0.95	0.94	0.94	0.94	0.94	0.95	0.95	0.96		
Numbe	er of day	, vs in mo	nth (Tab	le 1a)					,	Average =	Sum(40) ₁ .	12 /12=	0.95	(40)
- turno c	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
							I							
4. Wa	iter hea	ting ene	rgy requ	irement:								kWh/ye	ear:	
if TF	A > 13.	upancy, 9, N = 1 9, N = 1		: [1 - exp	(-0.0003	849 x (TF	- A -13.9)2)] + 0.(0013 x (⁻	TFA -13.		36		(42)
Reduce	the annua	al average	hot water	usage by		lwelling is	designed	(25 x N) to achieve		se target o		.19		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)														
(44)m=	99.2	95.6	91.99	88.38	84.77	81.17	81.17	84.77	88.38	91.99	95.6	99.2		
_	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$													
					· ·					-			I	
(45)m=	147.12	128.67	132.78	115.76	111.07	95.85	88.82	101.92	103.13	120.19	131.2	142.48		
lf instant	aneous w	vater heati	ng at point	t of use (no	o hot water	r storage),	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =	-	1418.98	(45)
(46)m=	0	0	0	0	0	0	0	0	0	0	0	0		(46)
	storage										·			
-		. ,		• •			-	within sa	ame ves	sel		150		(47)
		-			velling, e ocludes i			n (47) ombi boil	ers) ente	r '0' in <i>(</i>	(47)			
	storage		not wat	51 (ti 115 11		nstantai								
	-		eclared I	oss facto	or is kno	wn (kWł	n/day):					0		(48)
Tempe	rature f	actor fro	m Table	2b								0		(49)
			-	e, kWh/ye				(48) x (49)) =			0		(50)
				•	loss fact							_		(54)
		-	ee secti		le 2 (kW	n/iitre/ua	iy)					0		(51)
	-	from Ta										0		(52)
Tempe	rature f	actor fro	m Table	2b							(0		(53)
Energy	lost fro	m watei	[.] storage	e, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0		(54)
Enter	(50) or	(54) in (5	55)									0		(55)
Water	storage	loss cal	culated	for each	month			((56)m = (55) × (41)	m				
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
If cylinde	er contain	s dedicate	d solar sto	rage, (57)	m = (56)m	x [(50) – (H11)] ÷ (5	50), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
Primar	y circuit	loss (ar	nnual) fro	om Table	e 3							0		(58)
								65 × (41)						
· ·	-	· · · · · ·			· · · · · ·	1	· · · · · ·	ng and a	· ·	· · · · · ·	, 		I	
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)

Combi	loss ca	lculated	for eac	h r	month ((61)m =	(60)) ÷ 36	65 × (41))m								_	
(61)m=	0	0	0		0	0		0	0	0		0	0		0	0)		(61)
Total h	eat req	uired for	water	hea	ating ca	alculated	l fo	r eacl	n month	(62)r	n =	0.85 × ((45)m	+ (4	6)m +	(57)	m +	(59)m + (61)m	
(62)m=	125.05	109.37	112.86	;	98.39	94.41	8	31.47	75.49	86.6	63	87.66	102.1	6 1	11.52	121	1.1		(62)
Solar DH	-IW input	calculated	using Ap	ppe	ndix G or	Appendix	Η ((negativ	ve quantity	/) (ente	er '0'	' if no sola	r contrib	oution	to wate	er hea	ting)		
(add a	dditiona	al lines if	FGHR	S a	and/or V	WWHRS	ap	plies,	, see Ap	pend	ix G	G)							
(63)m=	0	0	0		0	0		0	0	0		0	0		0	0)		(63)
Output	from w	ater hea	ter																
(64)m=	125.05	109.37	112.86	;	98.39	94.41	8	31.47	75.49	86.6	63	87.66	102.1	6 1	11.52	121	1.1		
										(Outp	out from wa	ater hea	ater (a	annual)	112		1206.13	(64)
Heat g	ains fro	m water	heating	g, I	kWh/m	onth 0.2	5 ´	[0.85	× (45)m	+ (6	1)m	n] + 0.8 x	k [(46)ı	m +	(57)m	+ (5	9)m]	
(65)m=	31.26	27.34	28.21	Т	24.6	23.6	2	0.37	18.87	21.6	66	21.92	25.54	1	27.88	30.	28		(65)
inclu	de (57)	m in calo	ulatior	ı of	f (65)m	only if c	ylir	nder is	s in the c	dwelli	ng	or hot w	ater is	fror	n com	mun	ity h	leating	
5. Int	ernal a	ains (see	e Table	5	and 5a):	-				-							-	
metab	Jan					May		Jun	Jul	Αι	Ja	Sep	Oct	t	Nov	D	ec		
(66)m=	117.87	117.87		+	117.87	117.87	_	17.87	117.87	117.	-	117.87	117.8		17.87	117			(66)
Liahtin	ι α αains	ı (calcula	i ted in A		pendix	L. equat	ion	L9 oi	r L9a), a	lso se	ee T	r Table 5	I			1			
(67)m=	18.57	r –	r	T		7.59		6.41	6.92	9		12.08	15.34	1	17.9	19.	08		(67)
				in						39) 3	معاد								
(68)m=		<u>,</u>	· · · · ·			178.77		65.01	155.82	153.		159.11	170.7	7 7	85.34	199	00		(68)
															100.04	100	.00		()
(69)m=	<u> </u>	<u> </u>		Ap T		L, equal 34.79		4.79	34.79	, aiso 34.7		34.79	34.79		34.79	34.	70	l	(69)
						34.79	J	4.79	34.79	54.7	9	54.79	54.78	,	34.79	54.	19		(00)
-		1	r	58					-		1							I	(70)
(70)m=			-			0		0	0	0		0	0		0	0)		(70)
		· ·	· -	-				-					1			-		I	
(71)m=	-94.29	-94.29	-94.29		-94.29	-94.29	-6	94.29	-94.29	-94.	29	-94.29	-94.29	9 ·	94.29	-94	.29		(71)
		Ť	· · · · ·	<u> </u>			_					r				-			
(72)m=	42.02	40.69	37.92		34.16	31.72	2	8.29	25.37	29.1		30.44	34.33		38.72	40.	69		(72)
Total i		gains =	:					(66)	m + (67)m	ı + (68)m +	⊦ (69)m + ((70)m +	(71)r	m + (72)m			
(73)m=	327.23	325.98	314.69	,	296.08	276.44	2	58.07	246.47	250.	13	259.98	278.7	3 3	300.32	317	.23		(73)
	lar gain																		
•			•	lar			and		•	tions t	0 CO	onvert to th	e applic	cable		tion.			
Orienta								Flu	x ole 6a		т	g_ able 6b		Tab	FF le 6c			Gains (W)	
•				ſ	111-			1 a.			1		_					(**)	-
Southe		0.77		×	3.	1	x	3	6.79	X		0.63	×		0.7		=	69.72	(77)
Southe	Ļ	0 0 0 0 om water heater 25.05 109.37 112.86 98.39 s from water heating, kWh/mo 1.26 27.34 28.21 24.6 (57)m in calculation of (65)m in calculation of (65)m in calculation of (65)m in calculated in Apr 17.87 117.87 117.87 igains (Table 5), Watts Jan Feb Mar Apr 7.87 117.87 117.87 117.87 yains (calculated in Appendix L 8.57 16.49 13.41 10.15 es gains (calculated in Appendix L 205 193.4 193.4 gains (calculated in Appendix L 4.79 34.79 34.79 od fans gains (Table 5a) 0 0 0 o 0 0 0 0 4.29 -94.29 -94.29 -94.29 ating gains (Table 5) 2.02 40.69 37.92 34.16 ernal gains = 27.23 325.98 314.69 296.08 gains: sare calculated using solar flux from 7 area Table 6d m ² o.9x 0.77 x 3.1 <td>4</td> <td>x</td> <td>3</td> <td>6.79</td> <td>x</td> <td></td> <td>0.63</td> <td>×</td> <td></td> <td>0.7</td> <td></td> <td>=</td> <td>27.44</td> <td>(77)</td>			4	x	3	6.79	x		0.63	×		0.7		=	27.44	(77)	
Southe	ast <mark>0.9x</mark>	Image: Second lines if FGHRS and/or WW 0 0 0 0 0 0 0 0 0 0 0 0 0 109.37 112.86 98.39 9 from water heating, kWh/month 26 27.34 28.21 24.6 2 26 27.34 28.21 24.6 2 2 57 in calculation of (65)m on 1 gains (see Table 5 and 5a): 1 ains (Table 5), Watts n Feb Mar Apr 1 87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 118 (calculated in Appendix L, etc.) 6 79 34.79 34.79 3 117 ins (calculated in Appendix L, etc.) 10 0 0 0 0 28 210.44 205 193.4 17 17 ins (calculated in Appendix L, etc.) 9 9 -94.29 -94.29 -9 -9 -9 9 <		65	x	3	6.79	x		0.63	x		0.7		=	68.21	(77)		
Southe		0.77		x	1.4	2	x	3	6.79	x		0.63	x		0.7		=	15.97	(77)
Southe	ast <mark>0.9x</mark>	0.77		×	3.	1	x	6	2.67	x		0.63	x		0.7		=	118.75	(77)

		1		1		1				1		۔_
Southeast 0.9x	0.77	X	2.44	X	62.67	X	0.63	X	0.7	=	46.74	(77)
Southeast 0.9x	0.54	x	8.65	X	62.67	X	0.63	x	0.7	=	116.19	(77)
Southeast 0.9x	0.77	x	1.42	x	62.67	X	0.63	x	0.7	=	27.2	(77)
Southeast 0.9x	0.77	x	3.1	x	85.75	x	0.63	x	0.7	=	162.48	(77)
Southeast 0.9x	0.77	x	2.44	x	85.75	x	0.63	x	0.7	=	63.95	(77)
Southeast 0.9x	0.54	x	8.65	x	85.75	x	0.63	x	0.7	=	158.98	(77)
Southeast 0.9x	0.77	x	1.42	x	85.75	x	0.63	x	0.7	=	37.21	(77)
Southeast 0.9x	0.77	x	3.1	x	106.25	x	0.63	x	0.7	=	201.33	(77)
Southeast 0.9x	0.77	x	2.44	x	106.25	x	0.63	x	0.7	=	79.23	(77)
Southeast 0.9x	0.54	x	8.65	x	106.25	x	0.63	x	0.7	=	196.98	(77)
Southeast 0.9x	0.77	x	1.42	x	106.25	x	0.63	x	0.7	=	46.11	(77)
Southeast 0.9x	0.77	x	3.1	x	119.01	x	0.63	x	0.7] =	225.5	(77)
Southeast 0.9x	0.77	x	2.44	x	119.01	x	0.63	x	0.7	=	88.75	(77)
Southeast 0.9x	0.54	x	8.65	x	119.01	x	0.63	x	0.7	=	220.64	(77)
Southeast 0.9x	0.77	x	1.42	x	119.01	x	0.63	x	0.7	=	51.65	(77)
Southeast 0.9x	0.77	x	3.1	x	118.15	x	0.63	x	0.7	=	223.87	(77)
Southeast 0.9x	0.77	x	2.44	x	118.15	x	0.63	x	0.7	=	88.1	(77)
Southeast 0.9x	0.54	x	8.65	x	118.15	x	0.63	x	0.7	=	219.04	(77)
Southeast 0.9x	0.77	x	1.42	x	118.15	x	0.63	x	0.7	=	51.27	(77)
Southeast 0.9x	0.77	x	3.1	x	113.91	x	0.63	x	0.7	=	215.84	(77)
Southeast 0.9x	0.77	x	2.44	x	113.91	x	0.63	x	0.7	=	84.94	(77)
Southeast 0.9x	0.54	x	8.65	x	113.91	×	0.63	x	0.7	=	211.18	(77)
Southeast 0.9x	0.77	x	1.42	x	113.91	x	0.63	x	0.7	=	49.43	(77)
Southeast 0.9x	0.77	x	3.1	x	104.39	x	0.63	x	0.7	=	197.8	(77)
Southeast 0.9x	0.77	x	2.44	x	104.39	x	0.63	x	0.7	=	77.84	(77)
Southeast 0.9x	0.54	x	8.65	x	104.39	x	0.63	x	0.7	=	193.53	(77)
Southeast 0.9x	0.77	x	1.42	x	104.39	x	0.63	x	0.7	=	45.3	(77)
Southeast 0.9x	0.77	x	3.1	x	92.85	x	0.63	x	0.7	=	175.94	(77)
Southeast 0.9x	0.77	x	2.44	x	92.85	x	0.63	x	0.7	=	69.24	(77)
Southeast 0.9x	0.54	x	8.65	x	92.85	x	0.63	x	0.7	=	172.14	(77)
Southeast 0.9x	0.77	x	1.42	x	92.85	×	0.63	x	0.7	=	40.29	(77)
Southeast 0.9x	0.77	x	3.1	x	69.27	×	0.63	x	0.7	=	131.25	(77)
Southeast 0.9x	0.77	x	2.44	x	69.27	x	0.63	x	0.7	=	51.65	(77)
Southeast 0.9x	0.54	x	8.65	x	69.27	x	0.63	x	0.7	=	128.42	(77)
Southeast 0.9x	0.77	x	1.42	x	69.27	x	0.63	x	0.7	=	30.06	(77)
Southeast 0.9x	0.77	x	3.1	x	44.07	x	0.63	x	0.7	=	83.5	(77)
Southeast 0.9x	0.77	x	2.44	x	44.07	×	0.63	x	0.7	=	32.86	(77)
Southeast 0.9x	0.54	x	8.65	x	44.07	x	0.63	x	0.7] =	81.7	(77)
Southeast 0.9x	0.77	x	1.42	x	44.07	x	0.63	x	0.7	=	19.13	(77)
Southeast 0.9x	0.77	x	3.1	x	31.49	x	0.63	x	0.7	=	59.66	(77)
Southeast 0.9x	0.77	x	2.44	×	31.49	×	0.63	x	0.7	=	23.48	(77)

Southeast 0.9	0.54	x	8.6	35	x S	31.49) x [0.63	ר × ר	0.7		58.38	(77)
Southeast 0.9	0.01					31.49		0.63					(77)
000000000	0.77	^	1.4	+2	x 3	51.49		0.03		0.7	=	13.66	(77)
Solar gains i	n watta a	alaulataa	l for ooo	h month			(92)m - 6	um(74)m .	(92)m				
(83)m= 181.3	1	422.62	523.65	586.53	582.29	561.39	514.48	457.61	341.38	217.2	155.18		(83)
Total gains -								1					
(84)m= 508.5		737.31	819.73	862.97	840.35	807.86	764.6	717.59	620.1	517.52	472.41		(84)
		1	I		<u>ا</u>	I	<u> </u>	<u> </u>	I	<u> </u>			
7. Mean int						from Tok		1 (00)					(05)
Temperatu	-	• •			-		JIE 9, TH	n (C)				21	(85)
Utilisation f		1	<u> </u>	1	r`	<u> </u>	A.1.9	San	Oct	Nov	Dee		
Jar		Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(86)
(86)m= 1	0.99	0.96	0.88	0.72	0.53	0.38	0.42	0.66	0.92	0.99	1		(00)
Mean interr	nal temper	rature in	living ar	ea T1 (fo	ollow ste	ps 3 to 7	7 in Tabl	e 9c)	i			I	
(87)m= 20.08	3 20.3	20.56	20.81	20.95	20.99	21	21	20.98	20.78	20.37	20.04		(87)
Temperatu	e during h	neating p	eriods in	n rest of	dwelling	g from Ta	able 9, T	h2 (°C)					
(88)m= 20.1 ²	20.11	20.11	20.12	20.12	20.13	20.13	20.14	20.13	20.12	20.12	20.12		(88)
Utilisation f	actor for a	ains for	rest of d	welling	h2 m (se	ee Table	9a)	•					
(89)m= 0.99	0.98	0.95	0.84	0.67	0.46	0.31	0.34	0.58	0.89	0.99	1		(89)
		I	<u> </u>	ا		I							
Mean interr		19.74	the rest	01 dweili 20.09	ng 12 (f 20.13	20.13	20.14	20.12	e 9C) 19.96	19.57	19.24	l	(90)
(90)m= 19.28	19.49	19.74	19.98	20.09	20.13	20.13	20.14						
									$\Delta = 1 m/m$				
								1	iLA = Livin	g area ÷ (4	+) =	0.46	(91)
Mean interr		1	or the wh	î	lling) = f	LA × T1	+ (1 – fL		LA = Livin	g area ÷ (4	+) =	0.46]
(92)m= 19.65	5 19.86	20.11	20.36	20.49	20.53	20.53	20.53	A) × T2 20.51	20.33	g area ÷ (4 19.94	+) =	0.46	(91)
(92)m= 19.65 Apply adjus	5 19.86 stment to t	20.11 he mear	20.36 interna	20.49 I temper	20.53 ature fro	20.53 om Table	20.53 4e, whe	-A) × T2 20.51 ere appro	20.33 opriate	19.94	19.61	0.46	(92)
(92)m= 19.65 Apply adjus (93)m= 19.65	5 19.86 stment to t 5 19.86	20.11 he mear 20.11	20.36 interna 20.36	20.49	20.53	20.53	20.53	A) × T2 20.51	20.33			0.46]
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he	19.86 tment to t 19.86 eating req	20.11 he mear 20.11 uirement	20.36 interna 20.36	20.49 I temper 20.49	20.53 ature fro 20.53	20.53 om Table 20.53	20.53 4e, whe 20.53	A) × T2 20.51 ere appro 20.51	20.33 opriate 20.33	19.94 19.94	19.61 19.61		(92)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the	19.86 tment to t 19.86 eating req e mean in	20.11 he mear 20.11 uirement ternal ter	20.36 interna 20.36 mperatu	20.49 I temper 20.49 re obtair	20.53 ature fro 20.53	20.53 om Table 20.53	20.53 4e, whe 20.53	A) × T2 20.51 ere appro 20.51	20.33 opriate 20.33	19.94 19.94	19.61 19.61		(92)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the the utilisation	5 19.86 atment to t 5 19.86 eating req e mean in on factor fe	20.11 he mear 20.11 uirement ternal ter or gains	20.36 ninterna 20.36 mperatu using Ta	20.49 I temper 20.49 re obtair able 9a	20.53 ature fro 20.53 ned at st	20.53 om Table 20.53 ep 11 of	20.53 4e, whe 20.53 Table 9	A) × T2 20.51 20.51 20.51 b, so tha	20.33 opriate 20.33 t Ti,m=(19.94 19.94 76)m an	19.61 19.61 d re-calc		(92)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the the utilisatio Jan	19.86atment to t19.8619.86eating reqe mean inon factor foFeb	20.11 he mear 20.11 uirement ternal ter or gains Mar	20.36 n interna 20.36 mperatu using Ta Apr	20.49 I temper 20.49 re obtair	20.53 ature fro 20.53	20.53 om Table 20.53	20.53 4e, whe 20.53	A) × T2 20.51 ere appro 20.51	20.33 opriate 20.33	19.94 19.94	19.61 19.61		(92)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space ho Set Ti to the the utilisation Utilisation f	19.86atment to t19.8619.86eating reqe mean inon factor foFeb	20.11 he mear 20.11 uirement ternal ter or gains Mar	20.36 n interna 20.36 mperatu using Ta Apr	20.49 I temper 20.49 re obtair able 9a	20.53 ature fro 20.53 ned at st	20.53 om Table 20.53 ep 11 of	20.53 4e, whe 20.53 Table 9	A) × T2 20.51 20.51 20.51 b, so tha	20.33 opriate 20.33 t Ti,m=(19.94 19.94 76)m an	19.61 19.61 d re-calc		(92)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the the utilisation Utilisation f (94)m= 0.99	19.86atment to t19.86ating reqating reqating reqating reqFebactor for g0.98	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95	20.36 interna 20.36 mperatu using Ta Apr i: 0.85	20.49 I temper 20.49 re obtair able 9a May 0.69	20.53 ature fro 20.53 ned at sto Jun	20.53 om Table 20.53 ep 11 of Jul	20.53 4e, whe 20.53 Table 9 Aug	A) × T2 20.51 20.51 20.51 b, so tha Sep	20.33 opriate 20.33 t Ti,m=(Oct	19.94 19.94 76)m an Nov	19.61 19.61 d re-calc Dec		(92) (93)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space ho Set Ti to the the utilisation Utilisation f	in 19.86 itment to to 19.86 itment req e mean in on factor for feb actor for g 0.98 s, hmGm	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95	20.36 interna 20.36 mperatu using Ta Apr i: 0.85	20.49 I temper 20.49 re obtair able 9a May 0.69	20.53 ature fro 20.53 ned at sto Jun	20.53 om Table 20.53 ep 11 of Jul	20.53 4e, whe 20.53 Table 9 Aug	A) × T2 20.51 20.51 20.51 b, so tha Sep	20.33 opriate 20.33 t Ti,m=(Oct	19.94 19.94 76)m an Nov	19.61 19.61 d re-calc Dec		(92) (93)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the the utilisation Utilisation f (94)m= 0.99 Useful gain (95)m= 505.5	19.86atment to t19.86ating reqating reqating reqating reqFebactor for g0.98s, hmGm6622.58	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78	20.36 interna 20.36 mperatu using Ta Apr : 0.85 4)m x (8 699.03	20.49 I temper 20.49 re obtair able 9a May 0.69 4)m 595.69	20.53 ature fro 20.53 ned at sta Jun 0.49 413.3	20.53 pm Table 20.53 ep 11 of Jul 0.34	20.53 4 e, whe 20.53 Table 9 Aug 0.38	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61	20.33 opriate 20.33 t Ti,m=(Oct 0.9	19.94 19.94 76)m an Nov 0.98	19.61 19.61 d re-calc Dec 1		(92) (93) (94)
(92)m= 19.68 Apply adjus (93)m= 19.68 8. Space ho Set Ti to the the utilisation Utilisation f (94)m= 0.99 Useful gain	19.86atment to t19.86ating reqating reqating reqating reqFebactor for g0.98s, hmGm6622.58	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78	20.36 interna 20.36 mperatu using Ta Apr : 0.85 4)m x (8 699.03	20.49 I temper 20.49 re obtair able 9a May 0.69 4)m 595.69	20.53 ature fro 20.53 ned at sta Jun 0.49 413.3	20.53 pm Table 20.53 ep 11 of Jul 0.34	20.53 4 e, whe 20.53 Table 9 Aug 0.38	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61	20.33 opriate 20.33 t Ti,m=(Oct 0.9	19.94 19.94 76)m an Nov 0.98	19.61 19.61 d re-calc Dec 1		(92) (93) (94)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space ho Set Ti to the the utilisation (94)m= 0.99 Useful gain (95)m= 505.5 Monthly ave	19.86atment to t19.86atiment to t19.86ating reqating req <td>20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5</td> <td>20.36 interna 20.36 mperatur using Ta Apr : 0.85 4)m x (8- 699.03 mperature 8.9</td> <td>20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7</td> <td>20.53 ature fro 20.53 ned at sta Jun 0.49 413.3 able 8 14.6</td> <td>20.53 pm Table 20.53 ep 11 of Jul 0.34 275.97 16.6</td> <td>20.53 4e, whe 20.53 Table 9 Aug 0.38 289.21 16.4</td> <td>A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31</td> <td>20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6</td> <td>19.94 19.94 76)m an Nov 0.98 509.43</td> <td>19.61 19.61 d re-calc Dec 1 470.5</td> <td></td> <td>(92) (93) (94) (95)</td>	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5	20.36 interna 20.36 mperatur using Ta Apr : 0.85 4)m x (8- 699.03 mperature 8.9	20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7	20.53 ature fro 20.53 ned at sta Jun 0.49 413.3 able 8 14.6	20.53 pm Table 20.53 ep 11 of Jul 0.34 275.97 16.6	20.53 4e, whe 20.53 Table 9 Aug 0.38 289.21 16.4	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6	19.94 19.94 76)m an Nov 0.98 509.43	19.61 19.61 d re-calc Dec 1 470.5		(92) (93) (94) (95)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the the utilisation (94)m= 0.99 Useful gain (95)m= 505.5 Monthly ave (96)m= 4.3	19.8619.86attment to t19.86atting reqatting reqatting reqatting reqatting reqatting req0.98atting req0.98atting req4.9atting req4.9	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5 an intern	20.36 interna 20.36 mperatur using Ta Apr : 0.85 4)m x (8- 699.03 mperature 8.9	20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7	20.53 ature fro 20.53 ned at sta Jun 0.49 413.3 able 8 14.6	20.53 pm Table 20.53 ep 11 of Jul 0.34 275.97 16.6	20.53 4e, whe 20.53 Table 9 Aug 0.38 289.21 16.4	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6	19.94 19.94 76)m an Nov 0.98 509.43	19.61 19.61 d re-calc Dec 1 470.5		(92) (93) (94) (95)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space ho Set Ti to the the utilisation (94)m= 0.99 Useful gain (95)m= 505.5 Monthly ave (96)m= 4.3 Heat loss ra	19.86atment to t19.86atment to t19.86ating reqating reqating reqating reqattor for g0.98attor for g0.98s, hmGm6622.58attor for me4.9attor for me91082.98	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5 an intern 982.88	20.36 interna 20.36 mperatur using Ta Apr : 0.85 4)m x (8- 699.03 perature 8.9 nal tempo 816.93	20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7 erature, 624.72	20.53 ature fro 20.53 ned at sta Jun 0.49 413.3 able 8 14.6 Lm , W = 416.61	20.53 m Table 20.53 ep 11 of Jul 0.34 275.97 16.6 =[(39)m 276.29	20.53 24e, whe 20.53 Table 9 Aug 0.38 289.21 16.4 x [(93)m 289.77	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31 14.1 - (96)m 452.81	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6] 692.22	19.94 19.94 76)m and Nov 0.98 509.43 7.1 917.44	19.61 19.61 d re-calc Dec 1 470.5 4.2		(92) (93) (94) (95) (96)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space he Set Ti to the the utilisation f (94)m= 0.99 Useful gain (95)m= 505.5 Monthly ave (96)m= 4.3 Heat loss ra (97)m= 1113.	19.86attment to t19.86attment to t19.86atting reqatting reqatting req0.98atting req0.98atting req4.94.91082.981082.98ing requir	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5 an intern 982.88	20.36 interna 20.36 mperatur using Ta Apr : 0.85 4)m x (8- 699.03 perature 8.9 nal tempo 816.93	20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7 erature, 624.72	20.53 ature fro 20.53 ned at sta Jun 0.49 413.3 able 8 14.6 Lm , W = 416.61	20.53 m Table 20.53 ep 11 of Jul 0.34 275.97 16.6 =[(39)m 276.29	20.53 24e, whe 20.53 Table 9 Aug 0.38 289.21 16.4 x [(93)m 289.77	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31 14.1 - (96)m 452.81	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6] 692.22	19.94 19.94 76)m and Nov 0.98 509.43 7.1 917.44	19.61 19.61 d re-calc Dec 1 470.5 4.2		(92) (93) (94) (95) (96)
(92)m= 19.63 Apply adjus (93)m= 19.63 8. Space ho Set Ti to the the utilisation f (94)m= 0.99 Useful gain (95)m= 505.5 Monthly av (96)m= 4.3 Heat loss ra (97)m= 1113. Space heat	19.86attment to t19.86attment to t19.86atting reqatting reqatting req0.98atting req0.98atting req4.94.91082.981082.98ing requir	20.11 he mear 20.11 uirement ternal ter or gains Mar ains, hm 0.95 , W = (94 696.78 ernal term 6.5 an intern 982.88 ement fo	20.36 interna 20.36 mperatul using Ta Apr 1: 0.85 4)m x (8 699.03 perature 8.9 nal tempo 816.93 or each n	20.49 I temper 20.49 re obtair able 9a May 0.69 4)m 595.69 e from Ta 11.7 erature, 624.72 nonth, k	20.53 ature fro 20.53 ned at sto Jun 0.49 413.3 able 8 14.6 Lm , W = 416.61 Wh/mon	20.53 pm Table 20.53 ep 11 of Jul 0.34 275.97 16.6 =[(39)m 276.29 th = 0.02	20.53 24e, whe 20.53 Table 9 Aug 0.38 289.21 16.4 x [(93)m 289.77 24 x [(97 0	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31 14.1 - (96)m 452.81)m - (95	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6] 692.22)m] x (4 101.15	19.94 19.94 76)m an Nov 0.98 509.43 7.1 917.44 1)m 293.77	19.61 19.61 d re-calc Dec 1 470.5 4.2 1106.63 473.28		(92) (93) (94) (95) (96)
(92)m= 19.65 Apply adjus (93)m= 19.65 8. Space ho Set Ti to the the utilisation f (94)m= 0.99 Useful gain (95)m= 505.5 Monthly ave (96)m= 4.3 Heat loss ra (97)m= 1113. Space heat (98)m= 452.6	i19.86itment to ti19.86eating reqe mean inon factor forFebactor for g0.98s, hmGm6622.58erage exte4.9ate for me91082.98ing requir1309.39	20.11 he mear 20.11 uirement ternal tern or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5 an intern 982.88 ement fo 212.85	20.36 interna 20.36 mperatur using Ta Apr 1: 0.85 4)m x (8- 699.03 mperature 8.9 nal tempo 816.93 or each n 84.88	20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7 erature, 624.72 nonth, kV 21.6	20.53 ature fro 20.53 ned at sto Jun 0.49 413.3 able 8 14.6 Lm , W = 416.61 Wh/mon	20.53 pm Table 20.53 ep 11 of Jul 0.34 275.97 16.6 =[(39)m 276.29 th = 0.02	20.53 24e, whe 20.53 Table 9 Aug 0.38 289.21 16.4 x [(93)m 289.77 24 x [(97 0	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31 14.1 - (96)m 452.81)m - (95 0	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6] 692.22)m] x (4 101.15	19.94 19.94 76)m an Nov 0.98 509.43 7.1 917.44 1)m 293.77	19.61 19.61 d re-calc Dec 1 470.5 4.2 1106.63 473.28	eulate 1949.52	(92) (93) (94) (95) (96) (97) (98)
(92)m= 19.63 Apply adjus (93)m= 19.63 8. Space ho Set Ti to the the utilisation (94)m= 0.99 Useful gain (95)m= 505.5 Monthly av (96)m= 4.3 Heat loss ra (97)m= 1113. Space heat	i19.86itment to ti19.86itment to ti19.86ing requing reqing requing requinging requinging requinging requing	20.11 he mear 20.11 uirement ternal tern or gains Mar ains, hm 0.95 , W = (94 696.78 ernal tem 6.5 an intern 982.88 ement fo 212.85 ement in	20.36 interna 20.36 mperatur using Ta Apr 1: 0.85 4)m x (8- 699.03 mperature 8.9 nal tempor 816.93 or each n 84.88 kWh/m ²	20.49 I temper 20.49 re obtain able 9a May 0.69 4)m 595.69 e from Ta 11.7 erature, 624.72 nonth, kV 21.6	20.53 ature fro 20.53 ned at sto Jun 0.49 413.3 able 8 14.6 Lm , W = 416.61 Wh/mon	20.53 pm Table 20.53 ep 11 of Jul 0.34 275.97 16.6 =[(39)m 276.29 th = 0.02	20.53 24e, whe 20.53 Table 9 Aug 0.38 289.21 16.4 x [(93)m 289.77 24 x [(97 0	A) × T2 20.51 20.51 20.51 b, so tha Sep 0.61 441.31 14.1 - (96)m 452.81)m - (95 0	20.33 ppriate 20.33 t Ti,m=(Oct 0.9 556.27 10.6] 692.22)m] x (4 101.15	19.94 19.94 76)m an Nov 0.98 509.43 7.1 917.44 1)m 293.77	19.61 19.61 d re-calc Dec 1 470.5 4.2 1106.63 473.28	culate	(92) (93) (94) (95) (96) (97)

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat I	oss rate	e Lm (ca	lculated	using 28	5°C inter	rnal temp	perature	and exte	ernal ten	nperatur	e from T	able 10)		
(100)m=	0	0	0	0	0	660.91	520.29	533.23	0	0	0	0		(100)
Utilisa	tion fac	tor for lo	ss hm											
(101)m=	0	0	0	0	0	0.98	0.99	0.99	0	0	0	0		(101)
Usefu	l loss, h	mLm (V	/atts) = ((100)m x	(101)m									
(102)m=	0	0	0	0	0	647.51	516.3	527.36	0	0	0	0		(102)
Gains	(solar g	gains cal	lculated	for appli	cable we	eather re	egion, se	e Table	10)					
(103)m=	0	0	0	0	0	1097.76	1056.98	1005.6	0	0	0	0		(103)
	•			r month, : 3 × (98		lwelling,	continuo	ous (kW	h) = 0.02	24 x [(10)3)m – (102)m]:	x (41)m	
(104)m=	0	0	0	0	0	324.18	402.26	355.81	0	0	0	0		
I									Total	= Sum(104)	=	1082.25	(104)
Cooled	fractior	า							f C =	cooled a	area ÷ (4	+) =	1	(105)
Intermi	ttency fa	actor (Ta	able 10b)		-					-			
(106)m=	0	0	0	0	0	0.25	0.25	0.25	0	0	0	0		
-									Total	' = Sum((104)	=	0	(106)
Space	cooling	requirer	nent for	month =	(104)m	× (105)	× (106)n	n						
(107)m=	0	0	0	0	0	81.04	100.57	88.95	0	0	0	0		
									Total	= Sum(107)	=	270.56	(107)
Space	cooling	requirer	nent in k	(Wh/m²/y	/ear				(107)	÷ (4) =			3.62	(108)
8f. Fab	ric Ener	gy Effici	ency (ca	alculated	l only un	der spec	cial cond	itions, se	ee sectic	on 11)				
Fabric	Energy	/ Efficier	псу						(99) -	+ (108) =	=		29.67	(109)
Targe	t Fabri	c Energ	y Efficie	ency (TF	EE)								34.12	(109)

			User D	etails:						
Assessor Name: Software Name:	Ross Boulto Stroma FSA			Stroma Softwa					028068 on: 1.0.4.18	
				Address:)2-05				
Address :		Flat Type 1-64	A, Wimb	oledon, L	ondon					
1. Overall dwelling dimer	nsions:			()						
Ground floor				a(m²) 4.82	(1a) x	Av. Hei	ight(m) 6	(2a) =	Volume(m ³) 194.54	(3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1	d)+(1e)+(1r	1) 7	4.82	(4)					
Dwelling volume					(3a)+(3b)	+(3c)+(3d)+(3e)+	.(3n) =	194.54	(5)
2. Ventilation rate:		1-				4 - 4 - 1				
Number of chimneys Number of open flues	main heating	secondar heating + 0 + 0	y] + [] + [0] = [total 0		40 = 20 =	m ³ per hour	(6a)
·	0	+ 0	」 · ∟	0	┘╴└	0			0	(6b)
Number of intermittent far	IS					3	x ?	10 =	30	(7a)
Number of passive vents						0	x ′	10 =	0	(7b)
Number of flueless gas fir	es					0	x 4	40 =	0	(7c)
								Air ch	anges per ho	ur
Infiltration due to chimney If a pressurisation test has be	-				continue fro	30 om (9) to (÷ (5) =	0.15	(8)
Number of storeys in th	e dwelling (ns)								0	(9)
Additional infiltration							[(9)-	-1]x0.1 =	0	(10)
Structural infiltration: 0.2 if both types of wall are pre deducting areas of opening	esent, use the valu gs); if equal user 0.	e corresponding to .35	o the great	er wall area	a (after	uction			0	(11)
If suspended wooden fle	oor, enter 0.2 (unsealed) or 0	.1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, ente									0	(13)
Percentage of windows	and doors dra	ught stripped		0.05 10.0		0.01			0	(14)
Window infiltration				0.25 - [0.2		-	(45)		0	(15)
Infiltration rate Air permeability value, o		Lin oubio motro		(8) + (10) ·				oroo	0	(16)
If based on air permeabilit					•		nvelope	alea	5	(17) (18)
Air permeability value applies						is being us	sed		0.4	
Number of sides sheltered						0			3	(19)
Shelter factor				(20) = 1 - [0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporation	ng shelter facto	or		(21) = (18)	x (20) =				0.31	(21)
Infiltration rate modified for	r monthly wind	speed								
Jan Feb I	Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spe	ed from Table	7								
(22)m= 5.1 5	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (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		

Adjust	ed infiltr	ation rat	e (allowi	ng for sl	nelter an	d wind s	peed) =	(21a) x	(22a)m			-	_		
	0.4	0.39	0.38	0.34	0.34	0.3	0.3	0.29	0.31	0.34	0.35	0.37			
	ate effec echanica		•	rate for t	he appli	cable ca	se								(23a)
				endix N (2	(23a) = (23a	a) x Fmv (e	equation (I	N5)) , othe	rwise (23h) = (23a)				0	4
								n Table 4h) = (200)				0	(23b)
			•		U			HR) (24a	, ,	2b)m + ('	23h) v [1 <u>- (23c</u>)		0	(23c)
(24a)m=				0					0	0		$\frac{1-(230)}{0}$]		(24a)
		-	, ,	÷	-	÷	Ţ	MV) (24b	1 - (22)	÷	23h)	, s	J		
(24b)m=				0	0				0	0	0	0	1		(24b)
	whole h				l			on from c	utside]		
,					•	•		c) = (22t		5 × (23b)				
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(24c)
,								on from I					•		
	<u> </u>		r <u>, ,</u>	· · ·	·	· · ·	<u> </u>	0.5 + [(2	r í	-	0.50	0.57	1		(244)
(24d)m=		0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57	J		(24d)
		-	· · · · · ·	· · · · · ·	i	<u> </u>	· · ·	d) in boy	<u> </u>	0.50	0.50	0.57	1		(25)
(25)m=	0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57	J		(25)
3. He	at losse	s and he	eat loss	paramete	er:										
ELEN	IENT	Gros area		Openin rr		Net Ar A ,r		U-valı W/m2		A X U (W/ł	<)	k-value kJ/m²⊷		A > kJ/	
Windo	ws Type	e 1				3.48	x1/	[1/(1.35)+	0.04] =	4.46					(27)
Windo	ws Type	2				2.74	x1/	[1/(1.35)+	+ 0.04] =	3.51					(27)
Windo	ws Type	3				9.71	x1/	[1/(1.35)+	+ 0.04] =	12.44					(27)
Windo	ws Type	e 4				1.59	x1/	[1/(1.35)+	+ 0.04] =	2.04					(27)
Floor						4.95	x	0.13		0.6435	= r				(28)
Walls		56.6	69	21		35.69) X	0.15	 = [5.35	ו ד		Ξī		(29)
Total a	area of e	lements	, m²			61.64	 i		·						(31)
				effective wi nternal wal			ated using	g formula 1	/[(1/U-valu	ie)+0.04] a	ns given in	paragrapl	h 3.2		
Fabric	heat los	s, W/K	= S (A x	U)				(26)(30)	+ (32) =				32	2.9	(33)
Heat c	apacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	870	0.97	(34)
Therm	al mass	parame	ter (TMF	- Cm -	- TFA) ir	n kJ/m²K			Indica	tive Value:	: Low		1	00	(35)
	•		ere the de tailed calc		construct	ion are not	t known pr	recisely the	e indicative	values of	TMP in T	able 1f			
					using Ap	pendix ł	<						9.	25	(36)
	-		,	own (36) =	• •	•									
Total f	abric he	at loss							(33) +	(36) =			42	.14	(37)
Ventila	ation hea	at loss ca	alculated	monthl	y				(38)m	= 0.33 × (25)m x (5)	•		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
(38)m=	37.22	37.02	36.83	35.91	35.74	34.94	34.94	34.79	35.25	35.74	36.09	36.45			(38)
Heat ti	ransfer o	coefficie	nt, W/K						(39)m	= (37) + (3	38)m		_		
(39)m=	79.36	79.16	78.97	78.05	77.88	77.08	77.08	76.94	77.39	77.88	78.23	78.59			_
									/	Average =	Sum(39)1	12 /12=	78	.05	(39)

Heat lo	oss para	ameter (H	HLP), W	/m²K					(40)m	= (39)m ÷	- (4)			
(40)m=	1.06	1.06	1.06	1.04	1.04	1.03	1.03	1.03	1.03	1.04	1.05	1.05		
Numbe	er of day	/s in mo	nth (Tab	le 1a)				•		Average =	Sum(40)1.	12 /12=	1.04	(40)
- turno c	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	iter hea	ting ene	rgy requ	irement:								kWh/ye	ear:	
if TF				: [1 - exp	(-0.0003	849 x (TF	-A -13.9	9)2)] + 0.0)013 x (TFA -13		36		(42)
Reduce	the annua	al average	hot water	usage by		lwelling is	designed	(25 x N) to achieve		se target o		.19		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)														
(44)m=	99.2	95.6	91.99	88.38	84.77	81.17	81.17	84.77	88.38	91.99	95.6	99.2		
_	141m = 99.2 95.6 91.99 88.38 84.77 81.17 81.17 84.77 88.38 91.99 95.6 99.2 Total = Sum(44) ₁₁₂ = Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d)													
Energy o	content of	hot water	used - cal	culated me	onthly = 4.	190 x Vd,r		DTm / 3600) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)	I	
(45)m=	147.12	128.67	132.78	115.76	111.07	95.85	88.82	101.92	103.13	120.19	131.2	142.48		-
lf instant	taneous v	vater heati	ng at point	t of use (no	o hot water	^r storage),	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =		1418.98	(45)
(46)m=	0	0	0	0	0	0	0	0	0	0	0	0		(46)
	storage			1			1		1	1				
-		. ,		• •			-	within sa	ame ves	sel	(0		(47)
		-			/elling, e ncludes i			ı (47) ombi boil	ers) ente	er '0' in (47)			
	storage			,					,	,	,			
a) If m	anufact	turer's de	eclared I	oss facto	or is kno	wn (kWł	n/day):				(0		(48)
Tempe	erature f	actor fro	m Table	2b							(0		(49)
0,			•	e, kWh/ye				(48) x (49)) =		(0		(50)
				•	loss fact le 2 (kWl							0		(51)
		•	ee secti			1,1110,00	xy)					0		(01)
Volume	e factor	from Ta	ble 2a								(0		(52)
Tempe	erature f	actor fro	m Table	2b							(0		(53)
			•	e, kWh/ye	ear			(47) x (51)) x (52) x (53) =	(0		(54)
Enter	(50) or	(54) in (5	55)								(0		(55)
Water	storage	loss cal	culated	for each	month			((56)m = (55) × (41)	m				
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
If cylinde	er contain:	s dedicate	d solar sto	orage, (57)	m = (56)m	x [(50) – (H11)] ÷ (5	50), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
Primar	y circuit	loss (ar	nnual) fro	om Table	e 3						(0		(58)
	•						. ,	65 × (41)						
•				I	I	1	· · · · · ·	ng and a	· ·	r	, 		I	(==)
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)

Combi	loss ca	alculated	for eac	h montl	n (61)m =	(60	D) ÷ 36	65 × (41)	m						
(61)m=	0	0	0	0	0		0	0	0	0	0	0	0		(61)
Total h	neat rec	uired for	water h	neating	calculate	d fo	r eacl	n month	(62)m	= 0.85 ×	(45)m +	· (46)m +	(57)m +	(59)m + (61)m	
(62)m=	125.05	109.37	112.86	98.39	94.41	8	31.47	75.49	86.63	87.66	102.16	111.52	121.1]	(62)
Solar D	HW input	calculated	using Ap	pendix G	or Appendi	хH	(negativ	ve quantity) (enter '	0' if no sola	r contribu	ition to wate	er heating)	-	
(add a	dditiona	al lines if	FGHR	S and/o	WWHR	S ap	oplies,	, see Ap	pendix	G)				_	
(63)m=	0	0	0	0	0		0	0	0	0	0	0	0		(63)
Outpu	t from v	vater hea	ter												
(64)m=	125.05	109.37	112.86	98.39	94.41	8	31.47	75.49	86.63	87.66	102.16	111.52	121.1		_
			-	-					Ou	tput from w	ater heat	er (annual)	112	1206.13	(64)
Heat g	jains fro	om water	heating	, kWh/	month 0.2	25 ´	[0.85	× (45)m	+ (61)	m] + 0.8 x	x [(46)n	n + (57)m	+ (59)m]	
(65)m=	31.26	27.34	28.21	24.6	23.6	2	20.37	18.87	21.66	21.92	25.54	27.88	30.28		(65)
inclu	ude (57))m in calo	culation	of (65)	m only if a	cylii	nder is	s in the c	dwelling	, or hot w	ater is	from com	Imunity h	neating	
5. In	ternal g	ains (see	Table	5 and 5	a):										
					,										
motab	Jan	Feb	Mar		May	Γ	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
(66)m=	117.87	117.87	117.87	<u> </u>		1	17.87	117.87	117.87	117.87	117.87	117.87	117.87		(66)
Lightir	g gains	(calcula	ted in A	ppendi	x L, equa	tion	1 L9 01	r L9a), a	lso see	Table 5	1			1	
(67)m=	18.57	16.49	13.41		- <u> </u>	-	6.41	6.92	9	12.08	15.34	17.9	19.08]	(67)
Applia	nces da	ains (calc	ulated i	n Appe	ndix L. ec	uat	tion L'	13 or L1	3a), als	o see Ta	ble 5			1	
(68)m=	208.28	<u> </u>	205				65.01	155.82	153.66	159.11	170.7	185.34	199.09]	(68)
			L ated in A			_								1	
(69)m=	34.79	<u>`</u>		<u> </u>		-	34.79	34.79	34.79	34.79	34.79	34.79	34.79	1	(69)
				 5a)						l				1	
(70)m=		1	r`	1	0	Г	0	0	0	0	0	0	0	1	(70)
			_					Ū			Ů		<u> </u>	J	
(71)m=	-94.29	<u> </u>		-		—	94.29	-94.29	-94.29	-94.29	-94.29	-94.29	-94.29	1	(71)
					-34.23		54.25	-04.20	04.20	04.20	04.20	04.20	-04.20]	()
(72)m=	42.02	, , ,	, <u> </u>		31.72		28.29	25.37	29.11	30.44	34.33	38.72	40.69	1	(72)
				1 04.10	51.72	<u> </u>						71)m + (72]	(, _)
(73)m=	327.23	, 	r	206.0	3 276.44	12	(00)	246.47	250.13	1	278.73	1	317.23	1	(73)
. ,		1	314.09	290.0	270.44	2	58.07	240.47	250.15	239.98	270.73	300.32	317.23		(10)
	Ŭ		usina sol	ar flux fro	m Table 6a	and	lassoci	ated equa	tions to c	onvert to th	ne applica	ble orienta	tion.		
			-				Flu	•		g_		FF		Gains	
•								ole 6a		Table 6b	-	Table 6c		(W)	
Southe	ast <mark>0.9x</mark>	0.77		< 🗌	3.48	x	3	6.79	×	0.5	┐ × [0.8		70.99	(77)
	ast 0.9x					x	r	6.79	x	0.5		0.8	=	27.95	(77)
	ast 0.9x	put calculated using Appendix G or Appendix I or Appendix G or Appendix G or Appendix I or Appendix I or Appendix I or Appendix G or Appendix G or Appendix I or Appendix			x		6.79	x	0.5		0.8		69.45	(77)	
	ast 0.9x	put calculated using Appendix G or Aonal lines if FGHRS and/or W 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 26 27.34 28.21 24.6 26 27.34 28.21 24.6 37 117.87 28 27.34 28.21 24.6 27.34 28.21 24.6 37.71 117.87 317.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 117.87 34.79 34.79 34.79 34.79 <td>x</td> <td></td> <td>6.79</td> <td></td> <td>0.5</td> <td></td> <td>0.8</td> <td></td> <td>16.22</td> <td>](77)</td>				x		6.79		0.5		0.8		16.22](77)
	ast 0.9x					x		2.67	x	0.5		0.8		120.92	(77)
	0.07	0.77	· · · · · · · · · · · · · · · · · · ·	·	J.TU	~	<u>ہ</u>	2.01		0.0	^ L	0.0		120.32	(\cdots)

Southeast 0.9x	0.77	x	2.74	×	60.67	×	0.5	x	0.0	=	47.6	(77)
Southeast 0.9x	0.77	J		1	62.67	1	0.5		0.8		47.6](77)
Southeast 0.9x	0.54) × 1 ×	9.71	×	62.67	x x	0.5	x	0.8	=	118.3](<i>77</i>)
Southeast 0.9x	0.77	x x	1.59 3.48	x x	62.67 85.75	^ x	0.5	x x	0.8	=	27.62](<i>77</i>)
Southeast 0.9x	0.77	」 ^] x	2.74	x	85.75	x	0.5	x	0.8	=	65.13](77)
Southeast 0.9x	0.54	」 ^] ×	9.71	×	85.75	x	0.5	x	0.8	=	161.87](77)
Southeast 0.9x	0.34] ^] x	1.59	x	85.75	^ x	0.5	x	0.8	=	37.8](77)
Southeast 0.9x	0.77) ^] x	3.48	x	106.25	x x	0.5	x	0.8	=	204.99](77)
Southeast 0.9x	0.77] ^] x	2.74	x	106.25	^ x	0.5	x	0.8	=	80.7](77)
Southeast 0.9x	0.54	」 ^] x	9.71	x	106.25	x x	0.5	x	0.8	=	200.56](77)
Southeast 0.9x	0.77] ^] x	1.59	x	106.25	x	0.5	x	0.8	=	46.83](**)](77)
Southeast 0.9x	0.77) ^ x	3.48	x	119.01	x	0.5	x	0.8	=	229.61](**)](77)
Southeast 0.9x	0.77] ×	2.74	x	119.01	x	0.5	x	0.8	=	90.39](77)
Southeast 0.9x	0.54) ^ x	9.71	x	119.01	x	0.5	x	0.8	=	224.65](77)
Southeast 0.9x	0.77] x	1.59	x	119.01	x	0.5	x	0.8	=	52.45	(77)
Southeast 0.9x	0.77	」 】 ×	3.48	x	118.15	 x	0.5	x	0.8	=	227.95](77)
Southeast 0.9x	0.77	」 】 x	2.74	x	118.15	x	0.5	x	0.8	=	89.74](77)
Southeast 0.9x	0.54	」 】 x	9.71	x	118.15	l X	0.5	x	0.8	=	223.02](77)
Southeast 0.9x	0.77] x	1.59	x	118.15	x	0.5	x	0.8	=	52.07](77)
Southeast 0.9x	0.77] x	3.48	x	113.91	x	0.5	x	0.8	=	219.77](77)
Southeast 0.9x	0.77	x	2.74	x	113.91	x	0.5	x	0.8	=	86.52](77)
Southeast 0.9x	0.54	x	9.71	x	113.91	×	0.5	x	0.8	=	215.02	– (77)
Southeast 0.9x	0.77	x	1.59	x	113.91	x	0.5	x	0.8	=	50.21	(77)
Southeast 0.9x	0.77	x	3.48	x	104.39	×	0.5	x	0.8	=	201.4	(77)
Southeast 0.9x	0.77	x	2.74	x	104.39	×	0.5	x	0.8	=	79.29	(77)
Southeast 0.9x	0.54	x	9.71	x	104.39	×	0.5	x	0.8	=	197.05	(77)
Southeast 0.9x	0.77	x	1.59	x	104.39	x	0.5	x	0.8	=	46.01	(77)
Southeast 0.9x	0.77	x	3.48	x	92.85	×	0.5	x	0.8	=	179.14	(77)
Southeast 0.9x	0.77	x	2.74	x	92.85	×	0.5	x	0.8	=	70.52	(77)
Southeast 0.9x	0.54	x	9.71	x	92.85	×	0.5	x	0.8	=	175.27	(77)
Southeast 0.9x	0.77	x	1.59	x	92.85	×	0.5	x	0.8	=	40.92	(77)
Southeast 0.9x	0.77	x	3.48	x	69.27	x	0.5	x	0.8	=	133.64	(77)
Southeast 0.9x	0.77	x	2.74	x	69.27	×	0.5	x	0.8	=	52.61	(77)
Southeast 0.9x	0.54	x	9.71	x	69.27	×	0.5	x	0.8	=	130.75	(77)
Southeast 0.9x	0.77	x	1.59	×	69.27	×	0.5	x	0.8	=	30.53	(77)
Southeast 0.9x	0.77	x	3.48	x	44.07	×	0.5	x	0.8	=	85.03	(77)
Southeast 0.9x	0.77	x	2.74	×	44.07	×	0.5	x	0.8	=	33.47	(77)
Southeast 0.9x	0.54	x	9.71	×	44.07	×	0.5	x	0.8	=	83.19	(77)
Southeast 0.9x	0.77	x	1.59	×	44.07	×	0.5	x	0.8	=	19.42	(77)
Southeast 0.9x	0.77	x	3.48	×	31.49	×	0.5	x	0.8	=	60.75	(77)
Southeast 0.9x	0.77	x	2.74	x	31.49	x	0.5	x	0.8	=	23.92	(77)

Southeast 0.9x	0.54	x	9.7	71	x3	31.49	x	0.5	_ × _	0.8	=	59.44	(77)
Southeast 0.9x	0.77	X	1.5	59	× 3	31.49	x	0.5	x	0.8	=	13.88	(77)
Solar gains ir	314.45	alculatec 430.24	for eac 533.09	h month 597.1	592.78	571.51	(83)m = S 523.75	um(74)m . 465.86	<mark>(82)m</mark> 347.53	221.11	157.98	l	(83)
Total gains –							523.75	400.00	347.53	221.11	157.96		(03)
(84)m= 511.83	1	744.93	829.17	873.54	850.85	817.98	773.88	725.84	626.26	521.43	475.21		(84)
				I	I		110.00	120.01	020.20	021110	110.21		()
7. Mean inte			, e		, 	from Tok		1 (°C)				01	
Temperature	-				-		JIE 9, TH	T (C)				21	(85)
Utilisation fa	Feb	Mar	Apr	May	Jun	Jul	Δυσ	Son	Oct	Nov	Dec		
(86)m= 0.95	0.92	0.87	Арі 0.78	0.66	0.52	0.39	Aug 0.43	Sep 0.62	0.82	0.93	0.96		(86)
									0.02	0.95	0.30		(00)
Mean intern		I		i – – – –	1	i – – – – – – – – – – – – – – – – – – –	I	, <u> </u>	00.07	40.5	40.00	l	(07)
(87)m= 18.94	19.31	19.77	20.26	20.64	20.87	20.96	20.94	20.78	20.27	19.5	18.86		(87)
Temperature	e during h	neating p	eriods ir	n rest of	dwelling	from Ta	able 9, T	``´´	r	i			
(88)m= 20.03	20.04	20.04	20.05	20.05	20.06	20.06	20.06	20.05	20.05	20.05	20.04		(88)
Utilisation fa	ctor for g	ains for	rest of d	welling,	h2,m (se	e Table	9a)						
(89)m= 0.95	0.91	0.85	0.75	0.62	0.46	0.32	0.35	0.56	0.79	0.92	0.96		(89)
Mean intern	al temper	ature in	the rest	of dwelli	ng T2 (f	ollow ste	eps 3 to	7 in Tabl	e 9c)				
(90)m= 18.15		18.96	19.44	19.78	19.98	20.04	20.03	19.91	, 19.45	18.72	18.09		(90)
							20.00			-			
		ļ			<u> </u>		20.00			g area ÷ (4	4) =	0.46	(91)
Mean intern	al temper	ature (fo	r the wh		lling) – f	Ι	I	1			4) =	0.46	(91)
Mean intern (92)m= 18.51	· ·	ì		ole dwe	1 <u> </u>	î	I	A) × T2	LA = Livin	g area ÷ (4	, 	0.46	
(92)m= 18.51	18.88	19.33	19.82	20.17	20.39	20.46	+ (1 – fL 20.45	A) × T2 20.31	LA = Livin 19.83		4) = 18.44	0.46	(91) (92)
	18.88	19.33	19.82	20.17	20.39	20.46	+ (1 – fL 20.45	A) × T2 20.31	LA = Livin 19.83	g area ÷ (4	, 	0.46	
(92)m= 18.51 Apply adjust (93)m= 18.51	18.88 ment to t 18.88	19.33 he mear 19.33	19.82 internal 19.82	20.17 temper	20.39 ature fro	20.46 m Table	+ (1 – fL 20.45 4e, whe	A) × T2 20.31 20.31	LA = Livin 19.83 opriate	g area ÷ (4 19.08	18.44	0.46	(92)
(92)m= 18.51 Apply adjust	18.88 ment to t 18.88 ating requ	19.33 he mean 19.33 uirement	19.82 internal 19.82	20.17 temper 20.17	20.39 ature fro 20.39	20.46 m Table 20.46	+ (1 – fL 20.45 4e, whe 20.45	A) × T2 20.31 ere appro 20.31	LA = Livin 19.83 opriate 19.83	g area ÷ (4 19.08 19.08	18.44		(92)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisatio	18.88 ment to t 18.88 ating requ mean int n factor fo	19.33 he mean 19.33 uirement ternal ter or gains	19.82 internal 19.82 nperatur using Ta	20.17 temper 20.17 re obtain able 9a	20.39 ature fro 20.39 ned at st	20.46 m Table 20.46 ep 11 of	+ (1 – fL 20.45 4e, whe 20.45	A) × T2 20.31 ere appro 20.31 b, so tha	LA = Livin 19.83 opriate 19.83 t Ti,m=(g area ÷ (4 19.08 19.08 76)m an	18.44 18.44 d re-calc		(92)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisatio Jan	18.88ment to t18.88ating requestmean informed factor forFeb	19.33 he mean 19.33 uirement ternal ter or gains Mar	19.82 internal 19.82 nperatur using Ta Apr	20.17 temper 20.17 re obtain	20.39 ature fro 20.39	20.46 m Table 20.46	+ (1 – fL 20.45 4e, whe 20.45	A) × T2 20.31 ere appro 20.31	LA = Livin 19.83 opriate 19.83	g area ÷ (4 19.08 19.08	18.44		(92)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisatio Jan Utilisation fa	18.88 ment to t 18.88 ating requ mean int n factor for Feb ctor for g	19.33 he mean 19.33 uirement ternal ter or gains Mar ains, hm	19.82 internal 19.82 nperatur using Ta Apr :	20.17 temper 20.17 re obtain able 9a May	20.39 ature fro 20.39 ned at sto Jun	20.46 m Table 20.46 ep 11 of Jul	+ (1 – fL 20.45 4 e, whe 20.45 Table 9 Aug	A) × T2 20.31 ere appro 20.31 b, so tha Sep	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct	g area ÷ (4 19.08 19.08 76)m an Nov	18.44 18.44 d re-calc Dec		(92) (93)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisatio Jan Utilisation fa (94)m= 0.93	18.88ment to t18.88ating requestmean interpreterminefactor forFebctor for g0.89	19.33 he mean 19.33 uirement ternal ter or gains Mar ains, hm 0.83	19.82 internal 19.82 nperatur using Ta Apr : 0.75	20.17 I temper 20.17 re obtain able 9a May 0.63	20.39 ature fro 20.39 ned at st	20.46 m Table 20.46 ep 11 of	+ (1 – fL 20.45 4e, whe 20.45 Table 9	A) × T2 20.31 ere appro 20.31 b, so tha	LA = Livin 19.83 opriate 19.83 t Ti,m=(g area ÷ (4 19.08 19.08 76)m an	18.44 18.44 d re-calc		(92)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisation Jan Utilisation fa (94)m= 0.93 Useful gains	18.88 ment to t 18.88 ating required mean interpretion factor for Feb ctor for g 0.89 a, hmGm	19.33 he mean 19.33 uirement ternal ter or gains Mar ains, hm 0.83 , W = (94	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84	20.17 temper 20.17 re obtain able 9a May 0.63 4)m	20.39 ature fro 20.39 ned at sto Jun 0.48	20.46 m Table 20.46 ep 11 of Jul 0.35	+ (1 – fL 20.45 4 e, whe 20.45 Table 9 Aug 0.38	A) × T2 20.31 ere appro 20.31 b, so tha Sep 0.57	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78	g area ÷ (4 19.08 19.08 76)m an Nov	18.44 18.44 d re-calc Dec 0.94		(92) (93)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisation Utilisation fa (94)m= 0.93 Useful gains (95)m= 478.15	18.88ment to t18.88ating requestionmean intn factor forFebctor for g0.89a, hmGm571.62	19.33 he mean 19.33 uirement ternal ter or gains Mar ains, hm 0.83 , W = (94 621.48	19.82 internal 19.82 nperatur using Ta Apr : 0.75 4)m x (84 617.73	20.17 I temper 20.17 re obtain able 9a May 0.63 4)m 546.63	20.39 ature fro 20.39 ned at sta Jun 0.48 407.95	20.46 m Table 20.46 ep 11 of Jul	+ (1 – fL 20.45 4 e, whe 20.45 Table 9 Aug	A) × T2 20.31 ere appro 20.31 b, so tha Sep	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct	g area ÷ (4 19.08 19.08 76)m an Nov	18.44 18.44 d re-calc Dec		(92) (93)
 (92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisation Jan Utilisation fa (94)m= 0.93 Useful gains (95)m= 478.15 Monthly ave 	18.88 ment to t 18.88 ating requirement information factor for g ctor for g 0.89 c, hmGm 571.62 rage exter	19.33 he mean 19.33 uirement ternal ter or gains Mar ains, hm 0.83 , W = (94 621.48 ernal tem	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature	20.17 I temper 20.17 Te obtain able 9a May 0.63 4)m 546.63 e from Ta	20.39 ature fro 20.39 ned at sto Jun 0.48 407.95 able 8	20.46 m Table 20.46 ep 11 of Jul 0.35 286	+ (1 – fL 20.45 20.45 20.45 Table 9 Aug 0.38 296.52	A) × T2 20.31 ere appro 20.31 b, so tha Sep 0.57 415.59	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25	18.44 18.44 d re-calc Dec 0.94 448.51		(92) (93) (94) (95)
(92)m= 18.51 Apply adjust $(93)m= 18.51$ 8. Space he Set Ti to the the utilisatio Jan Utilisation fa $(94)m= 0.93$ Useful gains $(95)m= 478.15$ Monthly ave $(96)m= 4.3$	18.88 ment to t 18.88 ating required mean interpreterming factor for g 0.89 ctor for g 0.89 constrained 571.62 rage extermed 4.9	19.33he mean19.33uirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9	20.17 I temper 20.17 Te obtain able 9a May 0.63 4)m 546.63 e from Ta 11.7	20.39 ature fro 20.39 ned at sta Jun 0.48 407.95 able 8 14.6	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6	+ (1 – fL 20.45 20.45 20.45 Table 9 Aug 0.38 296.52 16.4	A) × T2 20.31 ere appro 20.31 b, so tha Sep 0.57 415.59	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6	g area ÷ (4 19.08 19.08 76)m an Nov	18.44 18.44 d re-calc Dec 0.94		(92) (93)
 (92)m= 18.51 Apply adjust (93)m= 18.51 8. Space here Set Ti to the the utilisation Jan Utilisation far (94)m= 0.93 Useful gains (95)m= 478.15 Monthly ave 	18.88 ment to t 18.88 ating requirement to t mean intermediation factor for g 0.89 ctor for g 0.89 c, hmGm 571.62 rage extermed 4.9 te for mean	19.33he mean19.33uirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9	20.17 I temper 20.17 Te obtain able 9a May 0.63 4)m 546.63 e from Ta 11.7	20.39 ature fro 20.39 ned at sta Jun 0.48 407.95 able 8 14.6	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6	+ (1 – fL 20.45 20.45 20.45 Table 9 Aug 0.38 296.52 16.4	A) × T2 20.31 ere appro 20.31 b, so tha Sep 0.57 415.59	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25	18.44 18.44 d re-calc Dec 0.94 448.51		(92) (93) (94) (95)
 (92)m= 18.51 Apply adjust (93)m= 18.51 8. Space here Set Ti to the the utilisation fare (94)m= 0.93 Useful gains (95)m= 478.15 Monthly ave (96)m= 4.3 Heat loss ratio 	18.88ment to t18.88ating requestionmean intern factor forFebctor for g0.890.89571.62rage externed4.9te for mean71106.5	19.33he mean19.33uirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5an intern1013.07	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9 al tempe 851.97	20.17 I temper 20.17 re obtain able 9a May 0.63 4)m 546.63 e from Ta 11.7 erature, 659.9	20.39 ature fro 20.39 ned at sta Jun 0.48 407.95 able 8 14.6 Lm , W = 446.09	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6 =[(39)m 297.41	+ (1 – fL 20.45 20.45 Table 9 Aug 0.38 296.52 16.4 x [(93)m 311.55	A) × T2 20.31 ere appro 20.31 b, so tha Sep 0.57 415.59 14.1 – (96)m 480.61	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6] 718.48	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25 7.1 937.07	18.44 18.44 d re-calc Dec 0.94 448.51 4.2		(92) (93) (94) (95) (96)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisation Utilisation fa (94)m= 0.93 Useful gains (95)m= 478.15 Monthly ave (96)m= 4.3 Heat loss ra (97)m= 1127.7	18.88 ment to t 18.88 ating required mean intermined n factor for ctor for g 0.89 c, hmGm 571.62 rage extermined 4.9 te for meaning 1106.5 ng required	19.33he mean19.33uirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5an intern1013.07	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9 al tempe 851.97	20.17 I temper 20.17 re obtain able 9a May 0.63 4)m 546.63 e from Ta 11.7 erature, 659.9	20.39 ature fro 20.39 ned at sta Jun 0.48 407.95 able 8 14.6 Lm , W = 446.09	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6 =[(39)m 297.41	+ (1 – fL 20.45 20.45 Table 9 Aug 0.38 296.52 16.4 x [(93)m 311.55	A) × T2 20.31 ere appro 20.31 b, so tha Sep 0.57 415.59 14.1 – (96)m 480.61	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6] 718.48	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25 7.1 937.07	18.44 18.44 d re-calc Dec 0.94 448.51 4.2		(92) (93) (94) (95) (96)
(92)m= 18.51 Apply adjust (93)m= 18.51 8. Space he Set Ti to the the utilisation Utilisation fa (94)m= 0.93 Useful gains (95)m= 478.15 Monthly ave (96)m= 4.3 Heat loss ra (97)m= 1127.7 Space heati	18.88 ment to t 18.88 ating required mean intermined n factor for ctor for g 0.89 c, hmGm 571.62 rage extermined 4.9 te for meaning 1106.5 ng required	19.33he mean19.33uirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5an intern1013.07ement for	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9 al tempe 851.97 r each m	20.17 1 temper 20.17 re obtain able 9a May 0.63 4)m 546.63 4)m 546.63 4)m 546.63 659.9 nonth, k)	20.39 ature fro 20.39 ned at sto Jun 0.48 407.95 able 8 14.6 Lm , W = 446.09 Wh/mon	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6 =[(39)m 297.41 th = 0.02	+ (1 – fL 20.45 24.e, whe 20.45 Table 9 Aug 0.38 296.52 16.4 x [(93)m 311.55 24 x [(97 0	A) × T2 20.31 20.31 20.31 b, so tha 5, so tha 0.57 415.59 14.1 - (96)m 480.61)m - (95	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6] 718.48)m] x (4 169.42	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25 7.1 937.07 1)m 336.11	18.44 18.44 d re-calc Dec 0.94 448.51 4.2 1119.26 499.04		(92) (93) (94) (95) (96)
(92)m= 18.51 Apply adjust $(93)m= 18.51$ 8. Space he Set Ti to the the utilisation Utilisation fa $(94)m= 0.93$ Useful gains $(95)m= 478.15$ Monthly ave $(96)m= 4.3$ Heat loss ra $(97)m= 1127.7$ Space heati $(98)m= 483.32$	18.88ment to t18.88ating requiredmean intern factor forFebctor for g0.890.89571.62rage externed4.9te for mean71106.5ng required359.43	19.33he mean19.33uirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5an intern1013.07ement fo291.34	19.82 internal 19.82 mperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9 al tempe 851.97 r each m 168.65	20.17 I temper 20.17 re obtain able 9a May 0.63 4)m 546.63 e from Ta 11.7 erature, 659.9 nonth, kV 84.27	20.39 ature fro 20.39 ned at sto Jun 0.48 407.95 able 8 14.6 Lm , W = 446.09 Wh/mon	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6 =[(39)m 297.41 th = 0.02	+ (1 – fL 20.45 24.e, whe 20.45 Table 9 Aug 0.38 296.52 16.4 x [(93)m 311.55 24 x [(97 0	A) × T2 20.31 ere appro 20.31 b, so that 5 sep 0.57 415.59 14.1 - (96)m 480.61)m - (95 0	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6] 718.48)m] x (4 169.42	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25 7.1 937.07 1)m 336.11	18.44 18.44 d re-calc Dec 0.94 448.51 4.2 1119.26 499.04	culate	(92) (93) (94) (95) (96) (97) (98)
(92)m= 18.51 Apply adjust $(93)m= 18.51$ 8. Space he Set Ti to the the utilisation Utilisation fa $(94)m= 0.93$ Useful gains $(95)m= 478.15$ Monthly ave $(96)m= 4.3$ Heat loss ra $(97)m= 1127.7$ Space heati	18.88 ment to t 18.88 ating required mean intern factor for g 0.89 ctor for g 0.89 571.62 rage externed 4.9 te for meaning 7 1106.5 ng required 359.43	19.33he mean19.33uirementuirementternal teror gainsMarains, hm 0.83 , W = (94)621.48ernal tem6.5an intern1013.07ement fo291.34ement in	19.82 internal 19.82 nperatur using Ta Apr : 0.75 4)m x (84 617.73 perature 8.9 al tempe 851.97 r each m 168.65	20.17 I temper 20.17 re obtain able 9a May 0.63 4)m 546.63 e from Ta 11.7 erature, 659.9 nonth, kV 84.27	20.39 ature fro 20.39 ned at sto Jun 0.48 407.95 able 8 14.6 Lm , W = 446.09 Wh/mon	20.46 m Table 20.46 ep 11 of Jul 0.35 286 16.6 =[(39)m 297.41 th = 0.02	+ (1 – fL 20.45 24.e, whe 20.45 Table 9 Aug 0.38 296.52 16.4 x [(93)m 311.55 24 x [(97 0	A) × T2 20.31 ere appro 20.31 b, so that 5 sep 0.57 415.59 14.1 - (96)m 480.61)m - (95 0	LA = Livin 19.83 ppriate 19.83 t Ti,m=(Oct 0.78 490.76 10.6] 718.48)m] x (4 169.42	g area ÷ (4 19.08 19.08 76)m an Nov 0.9 470.25 7.1 937.07 1)m 336.11	18.44 18.44 d re-calc Dec 0.94 448.51 4.2 1119.26 499.04	culate	(92) (93) (94) (95) (96) (97)

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat I	oss rate	e Lm (ca	lculated	using 28	5°C inter	nal temp	perature	and exte	ernal ten	nperatur	e from T	able 10)		
(100)m=	0	0	0	0	0	724.59	570.42	584.71	0	0	0	0		(100)
Utilisa	tion fac	tor for lo	ss hm											
(101)m=	0	0	0	0	0	0.87	0.91	0.9	0	0	0	0		(101)
Usefu	l loss, h	mLm (V	/atts) =	(100)m x	(101)m									
(102)m=	0	0	0	0	0	629.54	519.89	524.64	0	0	0	0		(102)
Gains	(solar g	gains cal	culated	for appli	cable we	eather re	egion, se	e Table	10)					
(103)m=	0	0	0	0	0	1110.53	1069.29	1016.89	0	0	0	0		(103)
		g require zero if (lwelling,	continue	ous (kW	′h) = 0.0	24 x [(10)3)m – (102)m]:	x (41)m	
(104)m=	0	0	0	0	0	346.31	408.76	366.23	0	0	0	0		
•									Total	= Sum(104)	=	1121.3	(104)
Cooled	fraction	า							f C =	cooled a	area ÷ (4	4) =	1	(105)
Intermi	ttency f	actor (Ta	able 10b)										
(106)m=	0	0	0	0	0	0.25	0.25	0.25	0	0	0	0		
									Total	' = Sum(104)	=	0	(106)
Space	cooling	requirer	nent for	month =	(104)m	× (105)	× (106)r	n						_
(107)m=	0	0	0	0	0	86.58	102.19	91.56	0	0	0	0		
									Total	= Sum(107)	=	280.33	(107)
Space	cooling	requirer	nent in k	«Wh/m²/y	/ear				(107)	÷ (4) =			3.75	(108)
8f. Fab	ric Ene	rgy Effici	ency (ca	alculated	l only un	der spec	cial cond	litions, se	ee sectio	on 11)				
Fabric	Energ	y Efficier	псу						(99) ·	+ (108) =	=		35.71	(109)

			User D	etails:						
Assessor Name: Software Name:	Ross Boulto Stroma FS/			Strom Softwa	are Ver	sion:			028068 on: 1.0.4.18	
			Property .			02-05				
Address :		, Flat Type 1-	64A, Wim	bledon, L	ondon					
1. Overall dwelling dimer	ISIONS:		•	- (2)		A 11	·) / - l	
Ground floor				a(m²) ′4.82	(1a) x	Av. He i	1 gnt(m) 2.6	(2a) =	Volume(m ³) 194.54	(3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+(1n) 7	4.82	(4)					
Dwelling volume					(3a)+(3b))+(3c)+(3d)+(3e)+	.(3n) =	194.54	(5)
2. Ventilation rate:									<u> </u>	
Number of chimneys Number of open flues	main heating 0	second heating + 0 + 0		0 0] = [total 0 0		40 = 20 =	m ³ per hour	(6a) (6b)
Number of intermittent fan	s				- L	0	x ^	10 =	0	(7a)
Number of passive vents						0	x ^	10 =	0	 (7b)
Number of flueless gas fire	20					0	×4	40 =	0	(7c)
						0			0	(70)
								Air ch	anges per ho	ur
Infiltration due to chimney If a pressurisation test has be	en carried out or	is intended, proc			continue fr	0 om (9) to (÷ (5) =	0	(8)
Number of storeys in the	e dwelling (ns)							0	(9)
Additional infiltration Structural infiltration: 0.2)E for steel or	timbor fromo	or 0.25 fo			uction	[(9)	-1]x0.1 =	0	(10)
if both types of wall are pre deducting areas of opening	esent, use the val gs); if equal user (ue corresponding 0.35	to the great	er wall are	a (after	uction			0	(11)
If suspended wooden flo	por, enter 0.2	(unsealed) or	0.1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, ente									0	(13)
Percentage of windows	and doors dra	aught stripped		0.05 10.0		0.01			0	(14)
Window infiltration				0.25 - [0.2 (8) + (10)			(45)		0	(15)
Infiltration rate Air permeability value, c		d in oubic mo	roo por bo					oroo	0	(16)
If based on air permeabilit			•				nvelope	alea	5	(17)
Air permeability value applies						is being us	sed		0.25	(18)
Number of sides sheltered						Ū			3	(19)
Shelter factor				(20) = 1 -	[0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporation	ng shelter fact	tor		(21) = (18)) x (20) =				0.19	(21)
Infiltration rate modified fo	r monthly wine	d speed								
Jan Feb N	Var Apr	May Jur	ı Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spe	ed from Table	e 7								
(22)m= 5.1 5 4	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (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		

Adjust	ed infiltra	ation rat	e (allowi	ing for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m				_		
	0.25	0.24	0.24	0.21	0.21	0.18	0.18	0.18	0.19	0.21	0.22	0.23			
	<i>ate effec</i> echanica		-	rate for t	he appli	cable ca	se								
				endix N (2	(23a) – (23a	a) x Emv (e	equation (N	N5)) , othe	rwise (23h) – (23a)			0.		(23a)
								n Table 4h) = (200)			0.		(23b)
			-	-	-					2b)m i (22h) v [1 (220)	<u> </u>		(23c)
a) II (24a)m=									a) = (22)			$\frac{1 - (23c)}{0}$) - 100]]		(24a)
		-		-	-				Ů	•	Ů	0]		(210)
0) II (24b)m=								ИV) (24b 0	0 = (22)	0	230)	0	1		(24b)
	-				-				-	0	0	0	J		(210)
,					•	•		on from c c) = (22b		5 × (23b)	-	_		
(24c)m=	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5			(24c)
,					•	•		on from l 0.5 + [(2		0.5]					
(24d)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(24d)
Effe	ctive air	change	rate - er	nter (24a) or (24t) or (24	c) or (24	d) in boy	(25)				4		
(25)m=	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5]		(25)
2 40	at loogo	o ond he		ooromot	or			•					4		
		Gros		paramet Openin		Net Ar	200	U-valı		AXU		k-value	<u>_</u>	АX	(k
ELEN		area		r		A,r		W/m2		(W/I	K)	kJ/m ² ·		kJ/l	
Windo	ws Type	e 1				3.48	×1/	[1/(1.35)+	+ 0.04] =	4.46					(27)
Windo	ws Type	2				2.74	/lx	[1/(1.35)+	+ 0.04] =	3.51					(27)
Windo	ws Type	93				9.71	x1/	[1/(1.35)+	⊦ 0.04] ₌	12.44					(27)
Windo	ws Type	e 4				1.59		[1/(1.35)+	+ 0.04] =	2.04	=				(27)
Floor						4.95	x	0.13		0.6435					(28)
Walls		56.6	69	21		35.69) x	0.15		5.35	i F				(29)
Total a	rea of e	lements	, m²			61.64			I		I				(31)
* for win	dows and	roof wind	ows, use e	effective wi nternal wal		alue calcul		g formula 1	/[(1/U-valu	ie)+0.04] a	as given in	paragraph	h 3.2		
Fabric	heat los	s, W/K :	= S (A x	U)	·			(26)(30)) + (32) =				32	.9	(33)
Heat c	apacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	870	.97	(34)
Therm	al mass	parame	eter (TMI	- = Cm -	- TFA) ir	ו kJ/m²K			Indica	tive Value	: Low		10	0	(35)
	•		ere the de tailed calc		construct	ion are noi	t known pr	recisely the	e indicative	values of	TMP in T	able 1f			
Therm	al bridge	es : S (L	x Y) cal	culated	using Ap	pendix I	<						9.2	25	(36)
if details	of therma	al bridging	are not kr	nown (36) =	= 0.05 x (3	1)									
Total fa	abric he	at loss							(33) +	(36) =			42.	14	(37)
Ventila	tion hea	at loss ca	alculated	d monthly	y				(38)m	= 0.33 × (25)m x (5)	7		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
(38)m=	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1			(38)
Heat tr	ansfer o	coefficie	nt, W/K						(39)m	= (37) + (3	38)m		_		
(39)m=	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24	74.24			_
										Average =	Sum(39)	12 /12=	74.	24	(39)

Heat lo	oss para	meter (H	HLP), W	/m²K					(40)m	= (39)m ÷	- (4)			
(40)m=	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99		
Numb	ar of day	r in mo	nth (Tab	le 12)				Į	,	Average =	Sum(40)1.	.12 /12=	0.99	(40)
Numbe	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
()												_		
4. Wa	ater heat	ting ene	rgy requ	irement:								kWh/ye	ear:	
if TF				: [1 - exp	o(-0.0003	849 x (TF	FA -13.9)2)] + 0.(0013 x (⁻	TFA -13		36		(42)
Reduce	the annua	al average	hot water		5% if the c	welling is	designed	(25 x N) to achieve		se target o		.19		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate	er usage i	n litres pei	r day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)						
(44)m=	99.2	95.6	91.99	88.38	84.77	81.17	81.17	84.77	88.38	91.99	95.6	99.2		
Energy	content of	hot water	used - ca	lculated m	onthly – 4	100 v Vd i		- DTm / 3600			$m(44)_{112} =$		1082.23	(44)
	147.12	128.67	132.78	115.76	111.07	95.85	88.82	101.92	103.13	120.19	131.2	142.48		
(45)m=	147.12	120.07	132.78	115.76	111.07	95.65	00.02	101.92			m(45) ₁₁₂ =		1418.98	(45)
lf instan	taneous w	vater heati	ng at point	t of use (no	o hot water	r storage),	enter 0 in	boxes (46		10tal – 0u	m(+0)112 -		1410.90	
(46)m=	22.07	19.3	19.92	17.36	16.66	14.38	13.32	15.29	15.47	18.03	19.68	21.37		(46)
	storage													
-		. ,		• •			-	within sa	ame ves	sei		0		(47)
	•	-		ank in dw er (this ir	-			ombi boil	ers) ente	er '0' in ((47)			
	storage			,					,					
a) If m	nanufact	urer's d	eclared I	oss facto	or is kno	wn (kWł	n/day):					C		(48)
Tempe	erature f	actor fro	m Table	2b)		(49)
			-	e, kWh/ye			1	(48) x (49)) =		1.	10		(50)
				cylinder l rom Tabl							0	02		(51)
		-	ee secti		- (0.	02		(-)
		from Ta									1.	03		(52)
Tempe	erature f	actor fro	m Table	2b							0	.6		(53)
•••			-	e, kWh/ye	ear			(47) x (51)) x (52) x (53) =		03		(54)
	. ,	(54) in (5		for anot	month			((EC)m (EE) (44)	~	1.	03		(55)
		i		for each			1	((56)m = (1		l	(50)
(56)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01 50), else (5	30.98	32.01	30.98	32.01	iv H	(56)
-				- · ·	r · ·	1	r	1		-				(57)
(57)m=	32.01	28.92	32.01	30.98	32.01	30.98	32.01	32.01	30.98	32.01	30.98	32.01		(57)
			,	om Table		FO)		2E (44)				0		(58)
	-						. ,	65 × (41) ng and a		r thermo	ostat)			
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
		I	I	I	I	I	L	I		I	I			

Combi	loss ca	alculated	for ea	ch	month ((61)m =	(60	D) ÷ 36	65 × (41))m					_	
(61)m=	0	0	0		0	0		0	0	0	0	0	0	0		(61)
Total h	eat req	uired for	water	he	ating ca	alculate	d fo	r eacl	h month	(62)m	= 0.85 ×	(45)m -	+ (46)m +	(57)m +	(59)m + (61)m	
(62)m=	202.39	178.6	188.0	5	169.25	166.35	1	49.34	144.09	157.19	156.63	175.47	7 184.69	197.75		(62)
Solar DI	-IW input	calculated	using A	ppe	endix G or	Appendi	хH	(negati	ve quantity	/) (enter	'0' if no sola	r contrib	ution to wate	er heating)	•	
(add a	dditiona	al lines if	FGHR	RS a	and/or \	WWHR	S ap	oplies	, see Ap	pendix	G)				_	
(63)m=	0	0	0		0	0		0	0	0	0	0	0	0		(63)
Output	from w	vater hea	iter													
(64)m=	202.39	178.6	188.0	5	169.25	166.35	1	49.34	144.09	157.19	156.63	175.47	7 184.69	197.75		
		-	-							Οι	Itput from w	ater hea	er (annual)	112	2069.82	(64)
Heat g	ains fro	om water	heatir	ng,	kWh/m	onth 0.2	25 ´	[0.85	× (45)m	+ (61)	m] + 0.8 x	x [(46)r	n + (57)m	+ (59)m	1]	
(65)m=	93.14	82.72	88.37	7	81.28	81.15	7	74.66	73.75	78.11	77.09	84.19	86.42	91.59		(65)
inclu	ide (57))m in cal	culatio	n o	f (65)m	only if a	cylii	nder i	s in the c	dwellin	g or hot w	/ater is	from com	n Imunity h	reating	
5. Int	ternal q	ains (see	e Table	e 5	and 5a):	-				-			-	-	
		ns (Table														
metab	Jan	Feb	Ma		Apr	May	Т	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
(66)m=	117.87	117.87	117.8	-+	117.87	117.87	1	17.87	117.87	117.87	-	117.87		117.87		(66)
Liahtin	a aains	s (calcula	ted in	Ap	pendix	L. equa	tion	L9 o	r L9a), a	lso see	Table 5	I			1	
(67)m=	18.57	16.49	13.41	<u> </u>	10.15	7.59	-	6.41	6.92	9	12.08	15.34	17.9	19.08	1	(67)
		l ains (calc	L	 Lin	Annen	l dix L ec			13 or I 1	l 3a) ale	so see Ta			ļ	1	
(68)m=	208.28	210.44	205		193.4	178.77	T	65.01	155.82	153.66		170.7	185.34	199.09	1	(68)
				 ^ ^ n			_				see Table		100.01	100.00	1	()
(69)m=	34.79	34.79	34.79	-i	34.79	2, equa	-	1L15 34.79	34.79	34.79	34.79	34.79	34.79	34.79	1	(69)
						54.75		94.73	54.75	54.75	54.75	54.75	54.79	54.75]	(00)
-		ins gains	r i		-	0	-	0	0	0					1	(70)
(70)m=	0	0	0		0	0	Ļ	0	0	0	0	0	0	0	J	(70)
		vaporatio	r	- T		, `	-	,							1	(74)
(71)m=			-94.2	_	-94.29	-94.29	-	94.29	-94.29	-94.29	-94.29	-94.29	-94.29	-94.29	J	(71)
		g gains (1		<u> </u>			_		-				-1		1	<i>(</i>)
(72)m=	125.19		118.7	8	112.89	109.08	1	03.7	99.13	104.99		113.15		123.11]	(72)
Total i	r	l gains =	1					(66)	m + (67)m	ı + (68)m	ı + (69)m +	(70)m +	(71)m + (72	1	1	
(73)m=	410.4	408.4	395.5	5	374.81	353.79	3	33.48	320.23	326	336.61	357.55	381.63	399.65		(73)
	lar gain															
			0	olar			and			tions to		ne applic	able orienta	tion.		
Orienta		Access F Table 6d			Area m ²			Flu Tał	x ole 6a		g_ Table 6b		FF Table 6c		Gains (W)	
0																٦
	ast <mark>0.9x</mark>	0.77		x	3.4	18	x	3	6.79	×	0.5	×	0.8	=	70.99	(77)
	ast <mark>0.9x</mark>	0.77		x	2.7	74	x	3	6.79	×	0.5	×	0.8	=	27.95	(77)
	ast <mark>0.9x</mark>	0.54		x	9.7	' 1	x	3	6.79	×	0.5	×	0.8	=	69.45	(77)
	ast <mark>0.9x</mark>	0.77		x	1.5	59	x	3	6.79	x	0.5	x	0.8	=	16.22	(77)
Southe	ast <mark>0.9x</mark>	0.77		x	3.4	18	x	6	2.67	x	0.5	x	0.8	=	120.92	(77)

contrasto 0.17 × 2.24 × 0.03 × 0.05 = 47.8 (77) Southeasto 0x 0.577 × 1.59 × 62.67 × 0.55 × 0.88 = 27.82 77 Southeasto 0x 0.77 × 1.59 × 62.67 × 0.55 × 0.88 = 615.64 (77) Southeasto 0x 0.77 × 2.44 × 85.75 × 0.65 × 0.88 = 6161.67 (77) Southeasto 0x 0.77 × 1.48 1062.5 × 0.65 × 0.88 = 201.90 (77) Southeasto 0x 0.77 × 1.59 × 1062.5 × 0.65 × 0.8 = 202.96 (77) Southeasto 0x 0.77 × 1.59 × 1062.5 × 0.65 × 0.8 = 222.961 (77) </th <th>Southeast 0.9x</th> <th>0.77</th> <th>] ×</th> <th>0.74</th> <th>×</th> <th>60.67</th> <th>×</th> <th>0.5</th> <th>x</th> <th>0.0</th> <th> = </th> <th>47.6</th> <th>(77)</th>	Southeast 0.9x	0.77] ×	0.74	×	60.67	×	0.5	x	0.0	=	47.6	(77)
Southeast 0.0x 0.77 x 1.59 x 0.62 x 0.0.8 = 171 Southeast 0.0x 0.77 x 3.44 x 8575 x 0.5 x 0.8 = 1163.44 (77) Southeast 0.0x 0.54 x 9.71 x 8575 x 0.5 x 0.8 = 6513 (77) Southeast 0.0x 0.777 x 1.58 x 6557 x 0.5 x 0.8 = 0.778 (77) Southeast 0.0x 0.777 x 3.48 x 10625 x 0.5 x 0.8 = 0.071 (77) Southeast 0.0x 0.777 x 2.74 x 10625 x 0.5 x 0.8 = 0.020167 (77) Southeast 0.0x 0.54 x 119.01 x 0.55 x 0.8 = 0.224.56 (77) Southeast 0.0x 0.54 x 119.01 x 0.55 x 0.8 = 0.2	L	0.77	J	2.74	1	62.67] 1	0.5		0.8	1	47.6	=
Southeast 0.0x 0.77 x 3.48 x 8575 x 0.5 x 0.88 = 165.44 (7) Southeast 0.0x 0.77 x 2.74 x 8675 x 0.5 x 0.88 = 66.13 (7) Southeast 0.0x 0.77 x 1.58 x 0.55 x 0.88 = 161.67 (7) Southeast 0.0x 0.77 x 2.48 x 106.25 x 0.5 x 0.88 = 204.99 (7) Southeast 0.0x 0.77 x 2.74 x 106.25 x 0.5 x 0.88 = 220.61 (7) Southeast 0.0x 0.77 x 3.48 x 119.01 x 0.55 x 0.88 = 222.61 (7) Southeast 0.0x 0.77 x 3.48 x 118.15 x 0.55 x 0.88 = 22.7.46	L		J		1] 1				1		=
Southeast 0.av 0.77 x 2.74 x 6.67 x 0.5 x 0.6 = 6.61.13 (7) Southeast 0.av 0.54 x 9.71 x 65.75 x 0.5 x 0.8 = 161.87 (7) Southeast 0.av 0.77 x 1.59 x 66.57 x 0.6 x 0.88 = 2004.99 (7) Southeast 0.av 0.54 x 9.71 x 106.25 x 0.5 x 0.88 = 200.56 (7) Southeast 0.av 0.57 x 1.59 x 106.25 x 0.5 x 0.8 = 220.61 (7) Southeast 0.av 0.77 x 1.48 119.01 x 0.5 x 0.8 = 224.65 (7) Southeast 0.av 0.77 x 1.48 x 1115.1 x 0.5 x 0.8 = <td< td=""><td>L</td><td></td><td>J T</td><td></td><td>1</td><td></td><td>] 1</td><td></td><td></td><td></td><td>1</td><td></td><td>4</td></td<>	L		J T		1] 1				1		4
Southeast 0.ax 0.54 × 0.71 × 0.57 × 0.5 × 0.6 = 161.67 (7) Southeast 0.ax 0.77 × 1.59 × 0.57 × 0.5 × 0.8 = 37.8 (7) Southeast 0.ax 0.77 × 2.44 × 106.25 × 0.5 × 0.8 = 200.5607 (7) Southeast 0.ax 0.77 × 1.59 × 106.25 × 0.5 × 0.8 = 40.83 (7) Southeast 0.ax 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.ax 0.77 × 1.59 × 119.01 × 0.5 × 0.8 = 224.65 (7) Southeast 0.ax 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = <td>L</td> <td></td> <td>J</td> <td></td> <td>1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>=</td>	L		J		1] 1				1		=
Southeast 0.x 0.77 x 1.59 x 66.75 x 0.5 x 0.8 = 37.4 (7) Southeast 0.x 0.77 x 2.74 x 106.25 x 0.5 x 0.8 = 204.99 (7) Southeast 0.x 0.54 x 9.71 x 106.25 x 0.5 x 0.8 = 200.56 (7) Southeast 0.x 0.77 x 1.59 x 106.25 x 0.5 x 0.8 = 200.56 (7) Southeast 0.x 0.77 x 3.48 x 119.01 x 0.5 x 0.8 = 229.61 (7) Southeast 0.x 0.77 x 2.74 x 119.01 x 0.5 x 0.8 = 224.65 (7) Southeast 0.x 0.77 x 3.48 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.x 0.77 x 3.48 x <	L		J		1] 1				1		4
Southeast 0.5x 0.77 x 3.48 x 1106.25 x 0.5 x 0.8 = 204.99 (77) Southeast 0.5x 0.77 x 2.74 x 106.25 x 0.5 x 0.8 = 200.56 (77) Southeast 0.5x 0.77 x 1.55 x 106.25 x 0.5 x 0.8 = 200.56 (77) Southeast 0.5x 0.77 x 1.55 x 106.25 x 0.5 x 0.8 = 229.61 (77) Southeast 0.5x 0.77 x 2.74 x 119.01 x 0.5 x 0.8 = 224.65 (77) Southeast 0.5x 0.54 x 9.71 x 118.01 x 0.5 x 0.8 = 223.02 (77) Southeast 0.5x 0.77 x 3.48 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0.5x 0.77 x 1.59	L		J		1] 1				1		4
Southeast 0.5% 0.77 × 2.74 × 1062.25 × 0.5 × 0.8 = 0.07 (77) Southeast 0.5% 0.54 × 0.77 × 1.59 × 1062.25 × 0.5 × 0.8 = 200.56 (77) Southeast 0.5% 0.77 × 1.59 × 1062.25 × 0.5 × 0.8 = 46.83 (77) Southeast 0.5% 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 229.61 (77) Southeast 0.5% 0.54 × 0.77 × 2.74 × 119.01 × 0.5 × 0.8 = 224.65 (77) Southeast 0.5% 0.77 × 3.48 × 118.15 × 0.5 × 0.8 = 227.95 (77) Southeast 0.5% 0.77 × 1.59 × 118.15 × 0.5 × 0.8 = 227.95 (77) Southeast	L		J		1] 1				1		4
Southeast 0.5k 0.54 x 0.71 x 106.25 x 0.5 x 0.8 = 200.56 (77) Southeast 0.5k 0.77 x 1.59 x 106.25 x 0.5 x 0.8 = 200.56 (77) Southeast 0.5k 0.77 x 2.74 x 119.01 x 0.55 x 0.88 = 229.61 (77) Southeast 0.5k 0.54 x 9.77 x 119.01 x 0.55 x 0.88 = 224.65 (77) Southeast 0.5k 0.77 x 1.58 x 118.15 x 0.5 x 0.88 = 223.02 (77) Southeast 0.5k 0.77 x 2.74 x 118.15 x 0.5 x 0.88 = 223.02 (77) Southeast 0.5k 0.77 x 2.74 x 113.91 x 0.5 x 0.88 = 221.77 (77) Southeast 0.5k 0.77 x 2.744 <td>L</td> <td></td> <td>J 7</td> <td></td> <td>1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>4</td>	L		J 7		1] 1				1		4
Southeast 0.5k 0.77 x 1.59 x 106.25 x 0.5 x 0.88 = 46.83 (7) Southeast 0.5k 0.77 x 3.48 x 119.01 x 0.55 x 0.88 = 229.61 (7) Southeast 0.5k 0.677 x 2.74 x 119.01 x 0.55 x 0.88 = 92.96.67 (7) Southeast 0.5k 0.677 x 1.59 x 118.15 x 0.55 x 0.88 = 224.65 (7) Southeast 0.5k 0.77 x 1.59 x 118.15 x 0.5 x 0.88 = 227.02 (7) Southeast 0.5k 0.77 x 2.744 x 118.15 x 0.5 x 0.88 = 221.02 (7) Southeast 0.5k 0.77 x 1.48 113.91 x 0.5 x 0.88 = 219.77 (7) Southeast 0.5k 0.77 x 1.48 113.91	Ľ		J		1] 1				1		\exists
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Southeast 0.9 0.77 x 2.74 x 119.01 x 0.75 x 0.8 = 00.39 0.71 Southeast 0.9x 0.54 x 9.71 x 119.01 x 0.55 x 0.8 = 224.65 (77) Southeast 0.9x 0.77 x 3.48 x 118.15 x 0.55 x 0.8 = 227.95 (77) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.55 x 0.8 = 227.95 (77) Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.55 x 0.8 = 223.02 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 219.07 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 215.02 <td>Ľ</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>4</td>	Ľ		1		1] 1				1		4
Southeast 0, ax 0.54 x 9.71 x 119.01 x 0.5 x 0.8 = 224.65 (77) Southeast 0, ax 0.77 x 1.59 x 119.01 x 0.5 x 0.8 = 224.65 (77) Southeast 0, ax 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.95 (77) Southeast 0, ax 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.95 (77) Southeast 0, ax 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0, ax 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 219.77 (77) Southeast 0, ax 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 219.77 (77) Southeast 0, ax 0.77 x 2.74 <td>Ľ</td> <td></td> <td>J</td> <td></td> <td>1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>\exists</td>	Ľ		J		1] 1				1		\exists
Southeast 0.9x 0.77 x 1.59 x 119.01 x 0.5 x 0.8 = 52.45 (77) Southeast 0.9x 0.77 x 3.48 x 118.15 x 0.5 x 0.8 = 52.45 (77) Southeast 0.9x 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0.9x 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 216.02 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 216.02 (77) Southeast 0.9x 0.77 x 2.74 <t< td=""><td>L</td><td></td><td>J</td><td></td><td>1</td><td></td><td>] 1</td><td></td><td></td><td></td><td>1</td><td></td><td></td></t<>	L		J		1] 1				1		
Southeast 0.9x 0.77 x 3.48 x 118.15 x 0.5 x 0.8 = 227.95 (7) Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 227.95 (7) Southeast 0.9x 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.5 x 0.8 = 221.02 (7) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 215.02 (7) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 215.02 (7) Southeast 0.9x 0.77 x 1.59 x 114.39 x 0.5 x 0.8 = 170.27 77 Southeast 0.9x 0.77 x 1.59 x <td>L</td> <td></td> <td>1 7</td> <td></td> <td>1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>4</td>	L		1 7		1] 1				1		4
Southeast 0.9x 0.77 x 2.74 x 118.15 x 0.5 x 0.8 = 99.74 (7) Southeast 0.9x 0.54 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.5 x 0.8 = 223.02 (7) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 219.77 (7) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 219.77 (7) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 219.07 (7) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 197.05 (7) Southeast 0.9x 0.77 x 2.74 x <td>L</td> <td></td> <td>J</td> <td></td> <td>1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>\exists</td>	L		J		1] 1				1		\exists
Southeast 0.5x 0.5.4 x 9.71 x 118.15 x 0.5 x 0.8 = 223.02 (77) Southeast 0.5x 0.77 x 11.59 x 118.15 x 0.55 x 0.8 = 223.02 (77) Southeast 0.9x 0.77 x 3.48 x 113.91 x 0.55 x 0.8 = 219.77 (77) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.55 x 0.8 = 215.02 (77) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.55 x 0.8 = 201.4 (77) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.55 x 0.8 = 201.4 (77) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.55 x 0.8 = 107.05 (77) Southeast 0.9x 0.77 x 1.59	L	0.77	J	3.48	X		X	0.5			=		╡
Southeast 0.9x 0.77 x 1.59 x 118.15 x 0.65 x 0.8 = 52.07 (7) Southeast 0.9x 0.77 x 3.48 x 113.91 x 0.55 x 0.8 = 219.77 (7) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.55 x 0.8 = 219.77 (7) Southeast 0.9x 0.54 x 9.71 x 113.91 x 0.55 x 0.8 = 215.02 (7) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.55 x 0.8 = 201.4 (7) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 201.4 (7) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 179.14 (7) Southeast 0.9x 0.77 x 2.74 9	L	0.77	X	2.74	X	118.15	X	0.5	X	0.8	=	89.74	4
Southeast 0.9x 0.77 x 3.48 x 113.91 x 0.5 x 0.8 = 219.77 17) Southeast 0.9x 0.77 x 2.74 x 113.91 x 0.5 x 0.8 = 219.77 17) Southeast 0.9x 0.54 x 9.71 x 113.91 x 0.5 x 0.8 = 219.77 17) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 219.77 17) Southeast 0.9x 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 201.4 (7) Southeast 0.9x 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 197.05 (7) Southeast 0.9x 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 170.14 (7) Southeast 0.9x 0.77 x 2.74 y <td>L</td> <td>0.54</td> <td>X</td> <td>9.71</td> <td>X</td> <td>118.15</td> <td>X</td> <td>0.5</td> <td>X</td> <td>0.8</td> <td>=</td> <td>223.02</td> <td>(77)</td>	L	0.54	X	9.71	X	118.15	X	0.5	X	0.8	=	223.02	(77)
Southeast $0.9x$ 0.77x2.74x113.91x0.5x0.8=86.52(77)Southeast $0.9x$ 0.54x9.71x113.91x0.5x0.8=215.02(77)Southeast $0.9x$ 0.77x1.59x113.91x0.5x0.8=215.02(77)Southeast $0.9x$ 0.77x3.48x104.39x0.5x0.8=201.4(77)Southeast $0.9x$ 0.77x2.74x104.39x0.5x0.8=201.4(77)Southeast $0.9x$ 0.54x9.71x104.39x0.5x0.8=197.05(77)Southeast $0.9x$ 0.77x1.59x104.39x0.5x0.8=197.05(77)Southeast $0.9x$ 0.77x1.59x104.39x0.5x0.8=197.05(77)Southeast $0.9x$ 0.77x3.48x92.85x0.5x0.8=175.27(77)Southeast $0.9x$ 0.77x1.59x92.85x0.5x0.8=175.27(77)Southeast $0.9x$ 0.77x1.59x92.85x0.5x0.8=10.52(77)Southeast $0.9x$ 0.77x3.48x69.27x <td>L</td> <td>0.77</td> <td>x</td> <td>1.59</td> <td>X</td> <td>118.15</td> <td>X</td> <td>0.5</td> <td>X</td> <td>0.8</td> <td>=</td> <td>52.07</td> <td>(77)</td>	L	0.77	x	1.59	X	118.15	X	0.5	X	0.8	=	52.07	(77)
Southeast $0.9x$ 0.54 \times 9.71 \times 113.91 \times 0.5 \times 0.8 $=$ 215.02 (77) Southeast $0.9x$ 0.77 \times 115.9 \times 113.91 \times 0.5 \times 0.8 $=$ 50.21 (77) Southeast $0.9x$ 0.77 \times 3.48 \times 104.39 \times 0.5 \times 0.8 $=$ 201.4 (77) Southeast $0.9x$ 0.77 \times 2.74 \times 104.39 \times 0.5 \times 0.8 $=$ 79.29 (77) Southeast $0.9x$ 0.77 \times 2.74 \times 104.39 \times 0.5 \times 0.8 $=$ 79.29 (77) Southeast $0.9x$ 0.77 \times 2.74 \times 104.39 \times 0.5 \times 0.8 $=$ 197.05 (77) Southeast $0.9x$ 0.77 \times 1.59 \times 104.39 \times 0.5 \times 0.8 $=$ 197.05 (77) Southeast $0.9x$ 0.77 \times 3.48 92.85 \times 0.5 \times 0.8 $=$ 70.52 (77) Southeast $0.9x$ 0.77 \times 2.74 \times 92.85 \times 0.5 \times 0.8 $=$ 70.52 (77) Southeast $0.9x$ 0.77 \times 1.59 \times 92.85 \times 0.5 \times 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 <td< td=""><td>Ľ</td><td>0.77</td><td>x</td><td>3.48</td><td>x</td><td>113.91</td><td>×</td><td>0.5</td><td>X</td><td>0.8</td><td>=</td><td>219.77</td><td>(77)</td></td<>	Ľ	0.77	x	3.48	x	113.91	×	0.5	X	0.8	=	219.77	(77)
Southeast $0.9x$ 0.77 x 1.59 x 113.91 x 0.5 x 0.8 = 50.21 (77) Southeast $0.9x$ 0.77 x 3.48 x 104.39 x 0.5 x 0.8 = 201.4 (77) Southeast $0.9x$ 0.77 x 2.74 x 104.39 x 0.5 x 0.8 = 79.29 (77) Southeast $0.9x$ 0.54 x 9.71 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 = 197.05 (77) Southeast $0.9x$ 0.77 x 3.48 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 3.48 69.27 x 0.5 x 0.8 =	L	0.77	x	2.74	x	113.91	x	0.5	X	0.8	=	86.52	(77)
Southeast $0.9x$ 0.77x3.48x104.39x0.5x0.8=201.4(77)Southeast $0.9x$ 0.77x2.74x104.39x0.5x0.8=79.29(77)Southeast $0.9x$ 0.54x9.71x104.39x0.5x0.8=197.05(77)Southeast $0.9x$ 0.54x9.71x104.39x0.5x0.8=197.05(77)Southeast $0.9x$ 0.77x1.59x104.39x0.5x0.8=197.05(77)Southeast $0.9x$ 0.77x3.48x92.85x0.5x0.8=179.14(77)Southeast $0.9x$ 0.77x2.74x92.85x0.5x0.8=175.27(77)Southeast $0.9x$ 0.77x1.59x92.85x0.5x0.8=175.27(77)Southeast $0.9x$ 0.77x3.48x69.27x0.5x0.8=133.64(77)Southeast $0.9x$ 0.77x2.74x69.27x0.5x0.8=52.61(77)Southeast $0.9x$ 0.77x1.59x69.27x0.5x0.8=30.53(77)Southeast $0.9x$ 0.77x3.48x44.07x<	L	0.54	x	9.71	x	113.91	x	0.5	x	0.8	=	215.02	(77)
Southeast $0.9x$ 0.77×2.74×104.39×0.5×0.8=79.29(77)Southeast $0.9x$ 0.54×9.71×104.39×0.5×0.8=197.05(77)Southeast $0.9x$ 0.77×1.59×104.39×0.5×0.8=197.05(77)Southeast $0.9x$ 0.77×1.59×104.39×0.5×0.8=197.05(77)Southeast $0.9x$ 0.77×3.48×92.85×0.5×0.8=179.14(77)Southeast $0.9x$ 0.77×2.74×92.85×0.5×0.8=175.27(77)Southeast $0.9x$ 0.77×1.59×92.85×0.5×0.8=175.27(77)Southeast $0.9x$ 0.77×1.59×92.85×0.5×0.8=133.64(77)Southeast $0.9x$ 0.77×2.74×69.27×0.5×0.8=133.64(77)Southeast $0.9x$ 0.77×2.74×69.27×0.5×0.8=130.75(77)Southeast $0.9x$ 0.77×1.59×69.27×0.5×0.8=30.53(77)Southeast $0.9x$ 0.77×3.48×44.07×	Ľ	0.77	x	1.59	x	113.91	x	0.5	x	0.8	=	50.21	(77)
Southeast $0.9x$ 0.54 x 9.71 x 104.39 x 0.5 x 0.8 $=$ 197.05 (77) Southeast $0.9x$ 0.77 x 1.59 x 104.39 x 0.5 x 0.8 $=$ 46.01 (77) Southeast $0.9x$ 0.77 x 3.48 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 9.71 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 33.64 (77) Southeast $0.9x$ 0.7	L	0.77	x	3.48	x	104.39	x	0.5	x	0.8	=	201.4	(77)
Note and the second se	Southeast 0.9x	0.77	x	2.74	×	104.39	x	0.5	x	0.8	=	79.29	(77)
Southeast $0.9x$ 0.77 x 3.48 x 92.85 x 0.5 x 0.8 $=$ 179.14 (77) Southeast $0.9x$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 $=$ 70.52 (77) Southeast $0.9x$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 $=$ 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.55 x 0.8 $=$ 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.55 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.55 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.55 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.55 x 0.8 $=$ 30.63 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.55 x 0.8 $=$ 30.63 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.54	L	0.54	x	9.71	x	104.39	x	0.5	x	0.8	=	197.05	(77)
Southeast $_{0.9x}$ 0.77 x 2.74 x 92.85 x 0.5 x 0.8 = 70.52 (77) Southeast $_{0.9x}$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast $_{0.9x}$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast $_{0.9x}$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 40.92 (77) Southeast $_{0.9x}$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $_{0.9x}$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $_{0.9x}$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $_{0.9x}$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $_{0.9x}$ 0.77 x 3.48 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $_{0.9x}$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $_{0.9x}$ 0.77 x 1.59 x 44.07 x 0.5 <	Southeast 0.9x	0.77	x	1.59	x	104.39	x	0.5	x	0.8	=	46.01	(77)
Southeast $0.9x$ 0.54 x 9.71 x 92.85 x 0.5 x 0.8 = 175.27 (77) Southeast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x	Southeast 0.9x	0.77	x	3.48	x	92.85	x	0.5	x	0.8	=	179.14	(77)
OrderOrderOrderOrderOrderSoutheast $0.9x$ 0.77 x 1.59 x 92.85 x 0.5 x 0.8 = 40.92 (77) Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 = 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 = 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 = 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59	Southeast 0.9x	0.77	x	2.74	x	92.85	x	0.5	x	0.8	=	70.52	(77)
Southeast $0.9x$ 0.77 x 3.48 x 69.27 x 0.5 x 0.8 $=$ 133.64 (77) Southeast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 $=$ 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 60.75 (77)	Southeast 0.9x	0.54	x	9.71	x	92.85	x	0.5	x	0.8	=	175.27	(77)
OutputSoutheast $0.9x$ 0.77 x 2.74 x 69.27 x 0.5 x 0.8 $=$ 52.61 (77) Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 $=$ 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 60.75 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 60.75 (77)	Southeast 0.9x	0.77	x	1.59	x	92.85	x	0.5	x	0.8	=	40.92	(77)
Southeast $0.9x$ 0.54 x 9.71 x 69.27 x 0.5 x 0.8 $=$ 130.75 (77) Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 $=$ 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 $=$ 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 83.19 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 $=$ 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 60.75 (77)	Southeast 0.9x	0.77	x	3.48	x	69.27	×	0.5	x	0.8	=	133.64	(77)
Southeast $0.9x$ 0.77 x 1.59 x 69.27 x 0.5 x 0.8 = 30.53 (77) Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	2.74	x	69.27	x	0.5	x	0.8	=	52.61	(77)
Southeast $0.9x$ 0.77 x 3.48 x 44.07 x 0.5 x 0.8 $=$ 85.03 (77) Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 $=$ 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 $=$ 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 $=$ 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 $=$ 60.75 (77)	Southeast 0.9x	0.54	x	9.71	x	69.27	x	0.5	x	0.8	=	130.75	(77)
Southeast $0.9x$ 0.77 x 2.74 x 44.07 x 0.5 x 0.8 = 33.47 (77) Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	1.59	x	69.27	x	0.5	x	0.8	=	30.53	(77)
Southeast $0.9x$ 0.54 x 9.71 x 44.07 x 0.5 x 0.8 = 83.19 (77) Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	3.48	x	44.07	x	0.5	x	0.8	=	85.03	(77)
Southeast $0.9x$ 0.77 x 1.59 x 44.07 x 0.5 x 0.8 = 19.42 (77) Southeast $0.9x$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.77	x	2.74	x	44.07	x	0.5	x	0.8	=	33.47	(77)
Southeast $_{0.9x}$ 0.77 x 3.48 x 31.49 x 0.5 x 0.8 = 60.75 (77)	Southeast 0.9x	0.54	x	9.71	x	44.07	x	0.5	x	0.8	=	83.19	(77)
	Southeast 0.9x	0.77	x	1.59	×	44.07	×	0.5	x	0.8	=	19.42	(77)
Southeast $0.9x$ 0.77 x 2.74 x 31.49 x 0.5 x 0.8 = 23.92 (77)	Southeast 0.9x	0.77	x	3.48	x	31.49	x	0.5	x	0.8	=	60.75	(77)
	Southeast 0.9x	0.77	x	2.74	x	31.49	x	0.5	x	0.8	=	23.92	(77)

Southoast							ı . —						
Southeast 0.9x	0.54	×	9.7			31.49		0.5		0.8	=	59.44	(77)
Southeast 0.9x	0.77	X	1.5	59	x;	31.49	x	0.5	×	0.8	=	13.88	(77)
								()	()				
Solar gains in (83)m= 184.6	watts, ca 314.45	430.24	for eac 533.09	h month 597.1	592.78	571.51	(83)m = S 523.75	um(74)m . 465.86	(82)m 347.53	221.11	157.98		(83)
Total gains – i							523.75	403.80	347.55	221.11	157.90		(00)
(84)m= 595	722.84	825.78	907.9	950.89	926.26	891.74	849.75	802.47	705.08	602.74	557.63		(84)
				I	l	001114	040.10	002.47	100.00	002.14	007.00		(0.)
7. Mean inter			, e										<u> </u>
Temperature	-				-		ole 9, Th	1 (°C)				21	(85)
Utilisation fac						<u> </u>					_		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(00)
(86)m= 0.93	0.89	0.83	0.74	0.61	0.47	0.35	0.38	0.56	0.77	0.9	0.94		(86)
Mean interna	l temper	ature in	living are	ea T1 (fo	ollow ste	eps 3 to 7	7 in Tabl	e 9c)					
<mark>(87)m=</mark> 19.27	19.61	20.01	20.42	20.73	20.91	20.97	20.96	20.84	20.43	19.76	19.18		(87)
Temperature	during h	eating p	eriods ir	n rest of	dwelling	g from Ta	able 9, T	h2 (°C)					
(88)m= 20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09	20.09		(88)
Utilisation fac	tor for a	ains for i	rest of d	welling	h2 m (si	u De Table	9a)						
(89)m= 0.92	0.88	0.81	0.71	0.57	0.42	0.28	0.31	0.5	0.74	0.88	0.93		(89)
Mean interna	· ·			1	- ·	1	20.06	7 in Tabl	· · · ·	18.49	47.05	l	(90)
(90)m= 17.79	18.27	18.83	19.39	19.8	20.01	20.07		IGGA	19.42	1849	17.65		(90)
							20.00						
				1			20.00			g area ÷ (4		0.46	(91)
Mean interna	l temper	ature (fo	r the wh	ole dwe		ļ	1	1				0.46	
(92)m= 18.47	18.88	19.37	19.86	20.22	lling) = f 20.42	LA × T1 20.48	+ (1 – fL 20.47	A) × T2 20.35	LA = Livin			0.46	
(92)m= 18.47 Apply adjustr	18.88 nent to ti	19.37 he mean	19.86 interna	20.22 temper	lling) = f 20.42 ature fro	LA × T1 20.48 om Table	+ (1 – fL 20.47 4e, whe	-A) × T2 20.35 ere appro	iLA = Livin 19.88 Opriate	g area ÷ (4 19.07	4) = 18.35	0.46	(91) (92)
(92)m= 18.47 Apply adjustr (93)m= 18.47	18.88 nent to tl 18.88	19.37 he mean 19.37	19.86 internal 19.86	20.22	lling) = f 20.42	LA × T1 20.48	+ (1 – fL 20.47	A) × T2 20.35	LA = Livin	g area ÷ (4	4) =	0.46	(91)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea	18.88 nent to tl 18.88 ting requ	19.37 he mean 19.37 uirement	19.86 interna 19.86	20.22 temper 20.22	lling) = f 20.42 ature fro 20.42	LA × T1 20.48 20.48 20.48	+ (1 – fL 20.47 4e, whe 20.47	A) × T2 20.35 ere appro 20.35	iLA = Livin 19.88 opriate 19.88	g area ÷ (4 19.07 19.07	4) = 18.35 18.35		(91) (92)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the	18.88 nent to tl 18.88 ting requ mean int	19.37 he mean 19.37 uirement ernal ter	19.86 internal 19.86 nperatui	20.22 I temper 20.22 re obtain	lling) = f 20.42 ature fro 20.42	LA × T1 20.48 20.48 20.48	+ (1 – fL 20.47 4e, whe 20.47	A) × T2 20.35 ere appro 20.35	iLA = Livin 19.88 opriate 19.88	g area ÷ (4 19.07 19.07	4) = 18.35 18.35		(91) (92)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation	18.88 nent to tl 18.88 Iting requ mean int factor fo	19.37 he mean 19.37 uirement ernal ter pr gains	19.86 internal 19.86 nperatur using Ta	20.22 I temper 20.22 re obtain able 9a	lling) = f 20.42 ature fro 20.42 led at st	LA × T1 20.48 20.48 20.48 ep 11 of	+ (1 – fL 20.47 4e, whe 20.47 Table 9	A) × T2 20.35 ere appro 20.35 b, so tha	19.88 ppriate 19.88 t Ti,m=(g area ÷ (4 19.07 19.07 76)m an	4) = 18.35 18.35 d re-calc		(91) (92)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation Jan	18.88 nent to tl 18.88 ting requ mean int factor fo Feb	19.37 he mean 19.37 uirement ernal ter or gains Mar	19.86 internal 19.86 nperatur using Ta Apr	20.22 I temper 20.22 re obtain	lling) = f 20.42 ature fro 20.42	LA × T1 20.48 20.48 20.48	+ (1 – fL 20.47 4e, whe 20.47	A) × T2 20.35 ere appro 20.35	iLA = Livin 19.88 opriate 19.88	g area ÷ (4 19.07 19.07	4) = 18.35 18.35		(91) (92)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation	18.88 nent to tl 18.88 ting requ mean int factor fo Feb	19.37 he mean 19.37 uirement ernal ter or gains Mar	19.86 internal 19.86 nperatur using Ta Apr	20.22 I temper 20.22 re obtain able 9a	lling) = f 20.42 ature fro 20.42 led at st	LA × T1 20.48 20.48 20.48 ep 11 of	+ (1 – fL 20.47 4e, whe 20.47 Table 9	A) × T2 20.35 ere appro 20.35 b, so tha	19.88 ppriate 19.88 t Ti,m=(g area ÷ (4 19.07 19.07 76)m an	4) = 18.35 18.35 d re-calc		(91) (92)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation Jan Utilisation fac	18.88 nent to tl 18.88 ting requ mean int factor fo Feb ctor for g 0.86	19.37 he mean 19.37 uirement ernal ter or gains Mar ains, hm 0.79	19.86 internal 19.86 nperatur using Ta Apr : 0.7	20.22 I temper 20.22 re obtain able 9a May 0.58	lling) = f 20.42 ature fro 20.42 ed at st Jun	LA × T1 20.48 20.48 20.48 ep 11 of Jul	+ (1 – fL 20.47 4e, whe 20.47 Table 9 Aug	A) × T2 20.35 ere appro 20.35 b, so tha	19.88 ppriate 19.88 t Ti,m=(Oct	g area ÷ (4 19.07 19.07 76)m an Nov	⁴⁾ = 18.35 18.35 d re-calc Dec		(91) (92) (93)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation Jan Utilisation fac (94)m= 0.9	18.88 nent to tl 18.88 ting requ mean int factor fo Feb ctor for g 0.86	19.37 he mean 19.37 uirement ernal ter or gains Mar ains, hm 0.79	19.86 internal 19.86 nperatur using Ta Apr : 0.7	20.22 I temper 20.22 re obtain able 9a May 0.58	lling) = f 20.42 ature fro 20.42 ed at st Jun	LA × T1 20.48 20.48 20.48 ep 11 of Jul	+ (1 – fL 20.47 4e, whe 20.47 Table 9 Aug	A) × T2 20.35 ere appro 20.35 b, so tha	19.88 ppriate 19.88 t Ti,m=(Oct	g area ÷ (4 19.07 19.07 76)m an Nov	⁴⁾ = 18.35 18.35 d re-calc Dec		(91) (92) (93)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space heat Set Ti to the the utilisation Jan Utilisation fact (94)m= 0.9 Useful gains,	18.88nent to tl18.88nent to tl18.88nting requiredmean intfactor forFebctor for ga0.86hmGm619.53	19.37 he mean 19.37 uirement ernal ter or gains (Mar ains, hm 0.79 , W = (94 654.68	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73	lling) = f 20.42 ature fro 20.42 ned at st Jun 0.44 404.62	LA × T1 20.48 20.48 20.48 ep 11 of Jul 0.31	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52	iLA = Livin 19.88 ppriate 19.88 t Ti,m=(Oct 0.73	g area ÷ (4 19.07 19.07 76)m an Nov	4) = 18.35 18.35 d re-calc Dec 0.92		(91) (92) (93) (94)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space heat Set Ti to the the utilisation Jan Utilisation fact (94)m= 0.9 Useful gains, (95)m= 538.23	18.88nent to tl18.88nent to tl18.88nting requiredmean intfactor forFebctor for ga0.86hmGm619.53	19.37 he mean 19.37 uirement ernal ter or gains (Mar ains, hm 0.79 , W = (94 654.68	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73	lling) = f 20.42 ature fro 20.42 ned at st Jun 0.44 404.62	LA × T1 20.48 20.48 20.48 ep 11 of Jul 0.31	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52	iLA = Livin 19.88 ppriate 19.88 t Ti,m=(Oct 0.73	g area ÷ (4 19.07 19.07 76)m an Nov	4) = 18.35 18.35 d re-calc Dec 0.92		(91) (92) (93) (94)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space heat Set Ti to the the utilisation Jan Utilisation fact (94)m= 0.9 Useful gains, (95)m= 538.23 Monthly aver	18.88nent to tl18.88nent to tl18.88nting requiredmean intfactor forFebctor for ga0.86hmGm619.53age exte4.9	19.37 he mean 19.37 uirement ernal ter or gains (Mar ains, hm 0.79 , W = (94 654.68 ernal tem 6.5	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7	lling) = f 20.42 ature frc 20.42 ed at st Jun 0.44 404.62 able 8 14.6	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52 417.87	iLA = Livin 19.88 ppriate 19.88 t Ti,m=(Oct 0.73 516.61 10.6	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 		(91) (92) (93) (94) (95)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space heat Set Ti to the the utilisation Utilisation fact (94)m= 0.9 Useful gains, (95)m= 538.23 Monthly aver (96)m= 4.3 Heat loss rate	18.88nent to tl18.88nent to tl18.88nting requiredmean intfactor forFebctor for ga0.86hmGm619.53age exte4.9	19.37 he mean 19.37 uirement ernal ter or gains (Mar ains, hm 0.79 , W = (94 654.68 ernal tem 6.5	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7	lling) = f 20.42 ature frc 20.42 ed at st Jun 0.44 404.62 able 8 14.6	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52 417.87	iLA = Livin 19.88 ppriate 19.88 t Ti,m=(Oct 0.73 516.61 10.6	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 		(91) (92) (93) (94) (95)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space heat Set Ti to the the utilisation Utilisation fact (94)m= 0.9 Useful gains, (95)m= 538.23 Monthly aver (96)m= 4.3 Heat loss rate	18.88 nent to tl 18.88 nent to tl 18.88 nting requirement mean int factor for factor for ga 0.86 hmGm 619.53 age exte 4.9 e for mea 1037.83	19.37 he mean 19.37 uirement ernal ter or gains (Mar ains, hm 0.79 , W = (94 654.68 ornal tem 6.5 an intern 955.66	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9 al tempe 813.96	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7 erature, 632.82	lling) = f 20.42 ature frc 20.42 ed at st Jun 0.44 404.62 able 8 14.6 Lm , W 431.93	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6 =[(39)m 288.18	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16 16.4 x [(93)m 302.43	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52 417.87 14.1 - (96)m 464.21	iLA = Livin 19.88 ppriate 19.88 t Ti,m=(Oct 0.73 516.61 10.6] 688.9	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76 7.1 8888.86	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 4.2 		(91) (92) (93) (93) (94) (95) (96)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space heat Set Ti to the the utilisation factor (94)m= 0.9 Useful gains, (95)m= 538.23 Monthly aver (96)m= 4.3 Heat loss rate (97)m= 1051.65	18.88 nent to tl 18.88 nent to tl 18.88 nting requirement mean int factor for factor for ga 0.86 hmGm 619.53 age exte 4.9 e for mea 1037.83	19.37 he mean 19.37 uirement ernal ter or gains (Mar ains, hm 0.79 , W = (94 654.68 ornal tem 6.5 an intern 955.66	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9 al tempe 813.96	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7 erature, 632.82	lling) = f 20.42 ature frc 20.42 ed at st Jun 0.44 404.62 able 8 14.6 Lm , W 431.93	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6 =[(39)m 288.18	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16 16.4 x [(93)m 302.43	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52 417.87 14.1 - (96)m 464.21	iLA = Livin 19.88 ppriate 19.88 t Ti,m=(Oct 0.73 516.61 10.6] 688.9	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76 7.1 8888.86	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 4.2 		(91) (92) (93) (93) (94) (95) (96)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation Jan Utilisation fac (94)m= 0.9 Useful gains, (95)m= 538.23 Monthly aver (96)m= 4.3 Heat loss rate (97)m= 1051.65 Space heatin	18.88 nent to tl 18.88 nent to tl 18.88 mean int factor for factor for g 0.86 hmGm 619.53 age exte 4.9 e for mea 1037.83 ng require	19.37 he mean 19.37 uirement or gains mains, hm 0.79 , W = (94 654.68 ernal tem 6.5 an intern 955.66 ement fo	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9 al tempe 813.96 r each n	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7 erature, 632.82 nonth, k	lling) = f 20.42 ature fro 20.42 ed at st Jun 0.44 404.62 able 8 14.6 Lm , W = 431.93 Wh/mon	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6 =[(39)m 288.18 th = 0.02	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16 16.4 x [(93)m 302.43 24 x [(97 0	A) × T2 20.35 ere appro 20.35 b, so tha Sep 0.52 417.87 14.1 - (96)m 464.21)m - (95	iLA = Livin 19.88 priate 19.88 t Ti,m=(Oct 0.73 516.61 10.6] 688.9)m] x (4 128.18	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76 7.1 888.86 1)m 265.03	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 4.2 1050.56 401.42 		(91) (92) (93) (93) (94) (95) (96)
(92)m= 18.47 Apply adjustr (93)m= 18.47 8. Space hea Set Ti to the the utilisation Jan Utilisation fac (94)m= 0.9 Useful gains, (95)m= 538.23 Monthly aver (96)m= 4.3 Heat loss rate (97)m= 1051.65 Space heatin	18.88nent to tl18.88nent to tl18.88nean intfactor fcFebctor for ga0.86hmGm619.53age exte4.9e for mea1037.83ig require281.09	19.37he mean19.37uirementuirementor gainsor gainsMarains, hm 0.79 , W = (94)654.68ornal tem6.5an intern955.66ement fo223.93	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9 al tempe 813.96 r each n 128.72	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7 erature, 632.82 nonth, kV 61.82	lling) = f 20.42 ature fro 20.42 ed at st Jun 0.44 404.62 able 8 14.6 Lm , W = 431.93 Wh/mon	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6 =[(39)m 288.18 th = 0.02	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16 16.4 x [(93)m 302.43 24 x [(97 0	A) × T2 20.35 ere appro 20.35 b, so that Sep 0.52 417.87 14.1 - (96)m 464.21)m - (95 0	iLA = Livin 19.88 priate 19.88 t Ti,m=(Oct 0.73 516.61 10.6] 688.9)m] x (4 128.18	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76 7.1 888.86 1)m 265.03	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 4.2 1050.56 401.42 	culate	(91) (92) (93) (93) (94) (95) (96) (97)
(92)m= 18.47 Apply adjustr $(93)m= 18.47$ 8. Space heat Set Ti to the the utilisation Utilisation fact $(94)m= 0.9$ Useful gains, $(95)m= 538.23$ Monthly aver $(96)m= 4.3$ Heat loss rate $(97)m= 1051.65$ Space heatin $(98)m= 381.98$	18.88 nent to tl 18.88 nent to tl 18.88 ting required mean int factor for factor for ga 0.86 hmGm 619.53 age exte 4.9 e for mea 1037.83 ig required 281.09	19.37he mean19.37uirementuirementor gainsor gainsmarains, hm 0.79 , W = (94)654.68ornal tem6.5an intern955.66ement fo223.93ement in	19.86 internal 19.86 mperatur using Ta Apr : 0.7 4)m x (84 635.18 perature 8.9 al tempe 813.96 r each n 128.72 kWh/m ²	20.22 I temper 20.22 re obtain able 9a May 0.58 4)m 549.73 e from Ta 11.7 erature, 632.82 nonth, kV 61.82	lling) = f 20.42 ature fro 20.42 ed at st Jun 0.44 404.62 able 8 14.6 Lm , W 431.93 Wh/mon 0	LA × T1 20.48 m Table 20.48 ep 11 of Jul 0.31 280.42 16.6 =[(39)m 288.18 th = 0.02 0	+ (1 – fL 20.47 20.47 20.47 Table 9 Aug 0.34 292.16 16.4 x [(93)m 302.43 24 x [(97 0	A) × T2 20.35 ere appro 20.35 b, so that Sep 0.52 417.87 14.1 - (96)m 464.21)m - (95 0	iLA = Livin 19.88 priate 19.88 t Ti,m=(Oct 0.73 516.61 10.6] 688.9)m] x (4 128.18	g area ÷ (4 19.07 19.07 76)m an Nov 0.86 520.76 7.1 888.86 1)m 265.03	 4) = 18.35 18.35 d re-calc Dec 0.92 511.02 4.2 1050.56 401.42 	culate	(91) (92) (93) (93) (94) (95) (96) (97) (98)

This part is used for space heating, space cooling or water heating provided by a community scheme.

Fraction of space heat from secor	ndary/supplementary heating (Tab	ole 11) '0' if non	e	0	(301)
Fraction of space heat from comm		,		1	(302)
The community scheme may obtain heat t includes boilers, heat pumps, geothermal	and waste heat from power stations. See		to four other heat sources;	the latter	_
Fraction of heat from Community				0.67	(303a)
Fraction of community heat from h	neat source 2			0.33	(303b)
Fraction of total space heat from (Community CHP		(302) x (303a) =	0.67	(304a)
Fraction of total space heat from of	community heat source 2		(302) x (303b) =	0.33	(304b)
Factor for control and charging me	ethod (Table 4c(3)) for community	/ heating syster	n	1	(305)
Distribution loss factor (Table 12c) for community heating system			1.05	(306)
Space heating Annual space heating requiremen	t			kWh/year 1872.18	r T
Space heat from Community CHF		(98) x (304a	a) x (305) x (306) =	1309.22	(307a)
Space heat from heat source 2		(98) x (304b	o) x (305) x (306) =	656.57	(307b)
Efficiency of secondary/suppleme	ntary heating system in % (from 1	Table 4a or App	pendix E)	0	(308
Space heating requirement from s	secondary/supplementary system	(98) x (301)	x 100 ÷ (308) =	0	(309)
Water heating Annual water heating requirement	t			2069.82	
If DHW from community scheme: Water heat from Community CHP		(64) x (303a	a) x (305) x (306) =	1447.42	(310a)
Water heat from heat source 2		(64) x (303b	o) x (305) x (306) =	725.89	(310b)
Electricity used for heat distributio	n	0.01 × [(307a)(307e) + (310a)(310e)] =	41.39	(313)
Cooling System Energy Efficiency	Ratio			0	(314)
Space cooling (if there is a fixed of	cooling system, if not enter 0)	= (107) ÷ (3	14) =	0	(315)
Electricity for pumps and fans with mechanical ventilation - balanced		side		92.56	(330a)
warm air heating system fans				0	(330b)
pump for solar water heating				0	(330g)
Total electricity for the above, kW	h/year	=(330a) + (3	330b) + (330g) =	92.56	(331)
Energy for lighting (calculated in A	Appendix L)			327.93	(332)
Electricity generated by PVs (App	endix M) (negative quantity)			-208.31	(333)
Electricity generated by wind turbi	ne (Appendix M) (negative quant	ity)		0	(334)
12b. CO2 Emissions – Communit	y heating scheme				
Electrical efficiency of CHP unit				32	(361)
Heat efficiency of CHP unit				50.4	(362)
		Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating from CHP)	(307a) × 100 ÷ (362) =	2597.65	× 0.22	561.09	(363)

less credit emissions for electricity $-(307a) \times (361) \div (362)$	831.25	x	0.52		-431.42	(364)
Water heated by CHP $(310a) \times 100 \div (362) =$	2871.87	x	0.22		620.32	(365)
less credit emissions for electricity $-(310a) \times (361) \div (362)$	919	x	0.52		-476.96	(366)
Efficiency of heat source 2 (%) If there is	CHP using two fuels repeat (363) to (3	66) for the secor	nd fuel	95	(367b
CO2 associated with heat source 2	[(307b)+(310b)] x 100 ÷ (36	7b) x	0.22	=	314.33	(368)
Electrical energy for heat distribution	[(313) x		0.52	=	21.48	(372)
Total CO2 associated with community systems	(363)(366) + (36	8)(372)		=	608.85	(373)
CO2 associated with space heating (secondary)	(309) x		0	=	0	(374)
CO2 associated with water from immersion heater or ins	stantaneous heater (3	12) x	0.22	=	0	(375)
Total CO2 associated with space and water heating	(373) + (374) + (37	5) =			608.85	(376)
CO2 associated with electricity for pumps and fans with	in dwelling (331)) x		0.52	=	48.04	(378)
CO2 associated with electricity for lighting	(332))) x		0.52	=	170.19	(379)
Energy saving/generation technologies (333) to (334) as Item 1	s applicable).52 × 0.0	01 =	-108.11	(380)
Total CO2, kg/year sum of (376)(38)	2) =				718.97	(383)
Dwelling CO2 Emission Rate $(383) \div (4) =$					9.61	(384)
El rating (section 14)					91.96	(385)

			User D	etails:						
Assessor Name: Software Name:	Ross Boulto Stroma FSA			Stroma Softwa					028068 on: 1.0.4.18	
				Address:)2-05				
Address :		Flat Type 1-64	A, Wimb	oledon, L	ondon					
1. Overall dwelling dimer	ISIONS:		A	(2)		A 11	·		M - L (2)	
Ground floor				a(m²) 4.82	(1a) x	Av. Hei	ignt(m) 6	(2a) =	Volume(m ³) 194.54	(3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1	ld)+(1e)+(1r	1) 7	4.82	(4)					
Dwelling volume					(3a)+(3b)	+(3c)+(3d)+(3e)+	.(3n) =	194.54	(5)
2. Ventilation rate:									2 1	
Number of chimneys Number of open flues	main heating	secondar heating + 0 + 0	y] + [] + [0 0] = [total 0 0		40 = 20 =	m ³ per hour	(6a) (6b)
Number of intermittent fan		0		0				10 =		
	S				Ļ	3			30	(7a)
Number of passive vents					L	0	X ?	10 =	0	(7b)
Number of flueless gas fire	es					0	x 4	40 =	0	(7c)
								Air ch	anges per ho	ur
Infiltration due to chimneys					continue fro	30 om (9) to (÷ (5) =	0.15	(8)
Number of storeys in the			()/			() (,		0	(9)
Additional infiltration							[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.2 if both types of wall are pre deducting areas of opening	sent, use the valu ns); if equal user 0	le corresponding to).35	the great	er wall area	a (after	uction			0	(11)
If suspended wooden flo			1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, ente									0	(13)
Percentage of windows	and doors dra	ught stripped		0.25 - [0.2	$x(14) \cdot 1$	001 -			0	(14)
Window infiltration Infiltration rate				(8) + (10) ·			L (15) –		0	(15)
Air permeability value, c	50 expressed	t in cubic metre						area	0	(16) (17)
If based on air permeabilit			•		•		nvelope	arca	5 0.4	(17)
Air permeability value applies						is being us	sed		0.4	
Number of sides sheltered	l								3	(19)
Shelter factor				(20) = 1 - [0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporation	ng shelter facto	or		(21) = (18)	x (20) =				0.31	(21)
Infiltration rate modified fo	r monthly wind	speed							1	
Jan Feb M	/lar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spe	ed from Table	7					-		1	
(22)m= 5.1 5 4	.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (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		

Adjust	ed infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m				_		
	0.4	0.39	0.38	0.34	0.34	0.3	0.3	0.29	0.31	0.34	0.35	0.37			
		<i>ctive air</i> al ventila	-	rate for t	he appli	cable ca	ise								
				andix N (2	(23a) – (23a	a) v Emv (e	aquation (I	N5)) , othe	rwise (23h) – (23a)				0	(23a)
								n Table 4h) = (200)				0	(23b)
			-	-	-) b)m i (22P) ^ [1 (220)	. 1001	0	(23c)
(24a)m=	r								a) = (22)	0		1 – (23c) 0	- 100]]		(24a)
		-	_	-	-	-			-		-	U			(=,
(24b)m=	r							VV) (24b	0	0	0	0	1		(24b)
										0	Ŭ	0	J		(=)
					•	•		on from c c) = (22t		5 × (23b)				
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0			(24c)
,								on from I 0.5 + [(2		0.5]					
(24d)m=	0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57			(24d)
Effe	ctive air	change	rate - er	nter (24a) or (24b	o) or (24	c) or (24	d) in boy	x (25)	_		-	_		
(25)m=	0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57			(25)
3 He	at losse	s and he	eat loss i	paramete	er.										
ELEN		Gros		Openin		Net Ar	ea	U-valı	ue	AXU		k-value	.	A>	Xk
		area		m		A ,r		W/m2		(W/	K)	kJ/m²-l		kJ/	
Windo	ws Type	e 1				3.1	x1	/[1/(1.4)+	0.04] =	4.11					(27)
Windo	ws Type	2				2.44	. x1	/[1/(1.4)+	0.04] =	3.23					(27)
Windo	ws Type	e 3				8.65	x1	/[1/(1.4)+	0.04] =	11.47					(27)
Windo	ws Type	9 4				1.42	1.42 $x1/[1/(1.4)+0.04] = 1.88$								(27)
Floor						4.95	x	0.13		0.6435					(28)
Walls		56.6	69	18.7	1	37.98	3 X	0.18		6.84			= i		(29)
Total a	area of e	lements	, m²			61.64	4		I		I		I		(31)
* for win	dows and	roof wind	ows, use e	effective wi		alue calcul		g formula 1	/[(1/U-valu	e)+0.04] a	as given in	paragraph	n 3.2		
Fabric	heat los	s, W/K :	= S (A x	U)				(26)(30)) + (32) =				33	2.29	(33)
Heat c	apacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =)3.03	(34)
Therm	al mass	parame	eter (TMI	- = Cm ÷	- TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		2	250	(35)
	-		ere the de tailed calc		construct	ion are noi	t known pi	recisely the	e indicative	values of	TMP in T	able 1f			
Therm	al bridge	es : S (L	x Y) cal	culated u	using Ap	pendix I	К						3	.08	(36)
if details	of therma	al bridging	are not kr	nown (36) =	= 0.05 x (3	1)									
Total f	abric he	at loss							(33) +	(36) =			3	5.37	(37)
Ventila	ation hea	at loss ca	alculated	monthl	y				(38)m	= 0.33 × (25)m x (5)			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
(38)m=	37.22	37.02	36.83	35.91	35.74	34.94	34.94	34.79	35.25	35.74	36.09	36.45			(38)
Heat tr	ransfer o	coefficie	nt, W/K						(39)m	= (37) + (3	38)m				
(39)m=	72.59	72.39	72.19	71.28	71.11	70.31	70.31	70.16	70.62	71.11	71.45	71.82			
										Average =	Sum(39)	12 /12=	7	1.28	(39)

Heat lo	oss para	imeter (H	HLP), W	/m²K					(40)m	= (39)m ÷	· (4)			
(40)m=	0.97	0.97	0.96	0.95	0.95	0.94	0.94	0.94	0.94	0.95	0.95	0.96		
Numb	er of day	r vs in mo	nth (Tab	le 1a)					,	Average =	Sum(40) ₁ .	12 /12=	0.95	(40)
Turno	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	ater hea	ting ene	rgy requ	irement:								kWh/ye	ear:	
if TF				(1 - exp	0(-0.0003	349 x (TF	FA -13.9)2)] + 0.(0013 x (⁻	TFA -13.		36		(42)
Reduce	the annua	al average	hot water		5% if the c	welling is	designed	(25 x N) to achieve		se target o		.19		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wat	er usage i	n litres pei		ach month	Vd,m = fa		Table 1c x	· ·			1			
(44)m=	99.2	95.6	91.99	88.38	84.77	81.17	81.17	84.77	88.38	91.99	95.6	99.2		—]
Energy	content of	hot water	used - ca	lculated m	onthly $= 4$.	190 x Vd,r	m x nm x L	OTm / 3600			m(44) ₁₁₂ = ables 1b, 1		1082.23	(44)
(45)m=	147.12	128.67	132.78	115.76	111.07	95.85	88.82	101.92	103.13	120.19	131.2	142.48		
lf instan	taneous v	vater heati	ng at point	t of use (no	o hot wate	r storage),	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =	=	1418.98	(45)
(46)m=	22.07	19.3	19.92	17.36	16.66	14.38	13.32	15.29	15.47	18.03	19.68	21.37		(46)
1 I I I I I I I I I I I I I I I I I I I	storage													
Storag	je volum	e (litres)) includir	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		150		(47)
		-		ank in dw	-			. ,		(0) : (47			
	storage		not wate	er (this ir	iciudes i	nstantar	ieous co	ombi boil	ers) ente	er 'O' in (47)			
	-		eclared I	oss facto	or is kno	wn (kWł	n/day):				1.	39		(48)
			m Table			,	,					54		(49)
				e, kWh/ye	ear			(48) x (49)) =			75		(50)
,				cylinder							L			
		-		rom Tabl	le 2 (kW	h/litre/da	ay)					0		(51)
		from Ta	ee secti	on 4.3								0		(52)
			m Table	2b								0 0		(52)
				e, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0		(54)
		(54) in (5	•	,, y					, , , ,	,		75		(55)
Water	storage	loss cal	culated	for each	month			((56)m = (55) × (41)ı	m				
(56)m=	23.33	21.07	23.33	22.58	23.33	22.58	23.33	23.33	22.58	23.33	22.58	23.33		(56)
· · ·								0), else (5					ix H	
(57)m=	23.33	21.07	23.33	22.58	23.33	22.58	23.33	23.33	22.58	23.33	22.58	23.33		(57)
Prima	y circuit	loss (ar	nnual) fro	om Table	e 3							0		(58)
Prima	y circuit	loss cal	culated	for each	month (• •	65 × (41)						
•			r	ı —	r	i		ng and a		i	, 			·
(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)

Combi	loss ca	alculated	for ea	ch	month ((61)m =	(60	D) ÷ 36	65 × (41))m								_	
(61)m=	0	0	0		0	0		0	0	0		0)	0	0]	(61)
Total h	neat req	uired for	water	he	ating ca	alculated	d fo	or each	n month	(62)r	n =	0.85 × ((45)r	n +	(46)m +	(57)r	m +	(59)m + (61)m	
(62)m=	193.71	170.76	179.3	57	160.85	157.67	1	40.94	135.41	148.	51	148.23	166	6.79	176.29	189.	.07		(62)
Solar DI	- HW input	calculated	using A	hppe	endix G or	Appendix	ĸН	(negativ	ve quantity	/) (ente	er '0'	' if no sola	r cont	ribu	tion to wate	er heat	ting)	•	
(add a	dditiona	al lines if	FGHF	RS a	and/or V	WWHRS	S ap	oplies,	, see Ap	pend	ix G	S)							
(63)m=	0	0	0		0	0		0	0	0		0	()	0	0			(63)
Output	t from w	vater hea	ter																
(64)m=	193.71	170.76	179.3	57	160.85	157.67	1	40.94	135.41	148.	51	148.23	166	6.79	176.29	189.	.07		
			•	-						(Dutp	out from wa	ater h	eate	er (annual)	12		1967.6	(64)
Heat g	ains fro	m water	heatir	ng,	kWh/mo	onth 0.2	5 ´	[0.85	× (45)m	+ (6	1)m	n] + 0.8 x	k [(46	5)m	+ (57)m	+ (59	9)m	1]	
(65)m=	86.19	76.45	81.42	2	74.56	74.21	6	67.94	66.81	71.1	6	70.37	77.	.24	79.7	84.6	65		(65)
inclu	ude (57))m in cal	ulatio	n o	f (65)m	only if c	ylin	nder is	s in the c	dwelli	ng	or hot w	vater	is f	rom com	muni	ity ł	heating	
5. In	ternal a	ains (see	e Table	e 5	and 5a):					-						•	-	
		ns (Table																	
wictab	Jan	Feb	 Ma		Apr	May	Γ	Jun	Jul	Au	ıa	Sep	С	Oct	Nov	D	ес]	
(66)m=	117.87	117.87	117.8	-	117.87	117.87	1	17.87	117.87	117.	Ť	117.87	117		117.87	117.		-	(66)
Liahtin	u dains	i (calcula	ı ted in	Ap	pendix	equat	tion	19 or	riga) a	lso se	e T	L Table 5						1	
(67)m=	18.57	16.49	13.4	<u> </u>	10.15	7.59	1	6.41	6.92	9		12.08	15.	.34	17.9	19.0	08	1	(67)
		ains (calc								39) 3					-			1	
(68)m=	208.28	<u>,</u>	205	_	193.4	178.77		65.01	155.82	153.		159.11	170		185.34	199.	09	1	(68)
							_								100.04	100.	.00	1	()
(69)m=	34.79	s (calcula 34.79	34.79	<u> </u>	34.79	L, equa 34.79	-	1L15 84.79	34.79	, aist 34.7		34.79	34.	70	34.79	34.	70	1	(69)
		1				54.75		94.73	34.79	54.7	3	54.75	54.	.13	54.75	54.	15]	(00)
-		ins gains	r –				1	0		0								1	(70)
(70)m=	3	3	3		3	3	Ļ	3	3	3		3		3	3	3		J	(70)
	<u> </u>	vaporatio	r È i	<u> </u>		, ,	—	,										1	(74)
(71)m=			-94.2		-94.29	-94.29	-9	94.29	-94.29	-94.2	29	-94.29	-94	.29	-94.29	-94.	.29	J	(71)
) gains (1		ŕ			-						, —					1	
(72)m=	115.85	113.77	109.4	4	103.56	99.74	9	94.36	89.79	95.6		97.73	103		110.69	113.	.78]	(72)
Total i		l gains =	:				-		m + (67)m	+ (68))m +	+ (69)m + ((70)m	+ (7	71)m + (72)	m		1	
(73)m=	404.06	402.06	389.2	21	368.48	347.46	3	27.14	313.9	319.	67	330.28	351	.22	375.29	393.	.31		(73)
	lar gain																		
			•				and			tions t	o co	nvert to th	ne app	olica	ble orientat	ion.			
Orient		Access F Table 6d			Area m ²			Flu	x ole 6a		т	g_ able 6b		т	FF able 6c			Gains (W)	
								- 1 au					_	, ,				(**)	-
	ast <mark>0.9x</mark>	0.77		x	3.	1	x	3	6.79	×		0.63	;	׼	0.7		=	69.72	(77)
	ast <mark>0.9x</mark>	0.77		x	2.4	4	x	3	6.79	x		0.63	;	׼	0.7		=	27.44	(77)
Southe	ast <mark>0.9x</mark>	0.54		x	8.6	5	x	3	6.79	x		0.63	;	×	0.7		=	68.21	(77)
	ast <mark>0.9x</mark>	0.77		x	1.4	2	x	3	6.79	x		0.63	;	×	0.7		=	15.97	(77)
Southe	ast <mark>0.9x</mark>	0.77		x	3.	1	x	6	2.67	x		0.63)	× [0.7		=	118.75	(77)

Southeast 0.9x	0.77] x	2.44	×	62.67	x	0.63	x	0.7	=	46.74	(77)
Southeast 0.9x	0.54) ^] x	8.65	x	62.67	x	0.63	x	0.7	=	116.19](**)](77)
Southeast 0.9x	0.77] ^] x	1.42	x	62.67	x	0.63	x	0.7	-	27.2](77)
Southeast 0.9x	0.77] ^] x	3.1	x	85.75	x	0.63	x	0.7	=	162.48](77)
Southeast 0.9x	0.77] ×	2.44	x	85.75	x	0.63	x	0.7	=	63.95](77)
Southeast 0.9x	0.54] ×	8.65	x	85.75	x	0.63	x	0.7	=	158.98	(77)
Southeast 0.9x	0.77	」 】 x	1.42	x	85.75	x	0.63	x	0.7	=	37.21](77)
Southeast 0.9x	0.77] x	3.1	x	106.25	x	0.63	x	0.7	=	201.33](77)
Southeast 0.9x	0.77	x	2.44	x	106.25	x	0.63	x	0.7	=	79.23	(77)
Southeast 0.9x	0.54	x	8.65	x	106.25	x	0.63	x	0.7	=	196.98	(77)
Southeast 0.9x	0.77	x	1.42	x	106.25	x	0.63	x	0.7	=	46.11	(77)
Southeast 0.9x	0.77	x	3.1	x	119.01	x	0.63	x	0.7	=	225.5	(77)
Southeast 0.9x	0.77	x	2.44	x	119.01	x	0.63	x	0.7	=	88.75	(77)
Southeast 0.9x	0.54	x	8.65	x	119.01	x	0.63	x	0.7	=	220.64	(77)
Southeast 0.9x	0.77	x	1.42	x	119.01	x	0.63	x	0.7	=	51.65	(77)
Southeast 0.9x	0.77	x	3.1	×	118.15	x	0.63	x	0.7	=	223.87	(77)
Southeast 0.9x	0.77	x	2.44	x	118.15	x	0.63	x	0.7	=	88.1	(77)
Southeast 0.9x	0.54	x	8.65	x	118.15	x	0.63	x	0.7	=	219.04	(77)
Southeast 0.9x	0.77	x	1.42	x	118.15	x	0.63	x	0.7	=	51.27	(77)
Southeast 0.9x	0.77	x	3.1	×	113.91	x	0.63	x	0.7	=	215.84	(77)
Southeast 0.9x	0.77	x	2.44	x	113.91	x	0.63	x	0.7	=	84.94	(77)
Southeast 0.9x	0.54	x	8.65	x	113.91	x	0.63	x	0.7	=	211.18	(77)
Southeast 0.9x	0.77	x	1.42	x	113.91	x	0.63	x	0.7	=	49.43	(77)
Southeast 0.9x	0.77	x	3.1	x	104.39	x	0.63	x	0.7	=	197.8	(77)
Southeast 0.9x	0.77	x	2.44	x	104.39	x	0.63	x	0.7	=	77.84	(77)
Southeast 0.9x	0.54	x	8.65	x	104.39	x	0.63	x	0.7	=	193.53	(77)
Southeast 0.9x	0.77	x	1.42	x	104.39	x	0.63	x	0.7	=	45.3	(77)
Southeast 0.9x	0.77	x	3.1	x	92.85	x	0.63	x	0.7	=	175.94	(77)
Southeast 0.9x	0.77	x	2.44	×	92.85	x	0.63	x	0.7	=	69.24	(77)
Southeast 0.9x	0.54	x	8.65	x	92.85	x	0.63	x	0.7	=	172.14	(77)
Southeast 0.9x	0.77	x	1.42	×	92.85	x	0.63	x	0.7	=	40.29	(77)
Southeast 0.9x	0.77	x	3.1	x	69.27	x	0.63	x	0.7	=	131.25	(77)
Southeast 0.9x	0.77	x	2.44	x	69.27	x	0.63	x	0.7	=	51.65	(77)
Southeast 0.9x	0.54	x	8.65	x	69.27	x	0.63	x	0.7	=	128.42	(77)
Southeast 0.9x	0.77	×	1.42	x	69.27	x	0.63	x	0.7	=	30.06	(77)
Southeast 0.9x	0.77	x	3.1	x	44.07	x	0.63	X	0.7	=	83.5	(77)
Southeast 0.9x	0.77	×	2.44	×	44.07	x	0.63	x	0.7	=	32.86	(77)
Southeast 0.9x	0.54	×	8.65	×	44.07	x	0.63	x	0.7	=	81.7	(77)
Southeast 0.9x	0.77	×	1.42	×	44.07	x	0.63	x	0.7	=	19.13	(77)
Southeast 0.9x	0.77	×	3.1	×	31.49	x	0.63	x	0.7	=	59.66	(77)
Southeast 0.9x	0.77	×	2.44	×	31.49	x	0.63	x	0.7	=	23.48	(77)

Southe	ast 0.9x	0.54	x	8.6	65	x [3	1.49	x	0.63	×		0.7	=	58.38	(77)
Southe	ast 0.9x	0.77	x	1.4	12	x [3	31.49	x	0.63	× ٦		0.7		13.66	(77)
	L	0.11			-					0.00					10.00	
Solar	naine in	watts, ca	alculator	l for eac	h month				(83)m - S	um(74)m .	(82)m					
(83)m=	181.33	308.88	422.62	523.65	586.53		32.29	561.39	514.48	457.61	341.3	1	7.2	155.18		(83)
		nternal a										_			I	
(84)m=	585.4	710.94	811.83	892.12	933.99	r È)9.43	875.29	834.14	787.89	692.5	59 592	2.49	548.5		(84)
		I	I	I	I		.0.10	010.20	001111	101.00	002.0			010.0		()
		nal temp		` U		<i>′</i>										_
Temp	erature	during h	neating p	eriods ir	n the livi	ng a	area f	from Tab	ole 9, Th	1 (°C)					21	(85)
Utilisa	ation fac	tor for g	ains for	living are	ea, h1,m	ı (se	e Ta	ble 9a)								
	Jan	Feb	Mar	Apr	May		Jun	Jul	Aug	Sep	Oc	t N	lov	Dec		
(86)m=	0.99	0.98	0.94	0.84	0.68	0).49	0.35	0.39	0.6	0.88	0.	98	0.99		(86)
Mean	interna	l temper	ature in	living ar	ea T1 (fe	ollo	w ste	ns 3 to 7	in Table	e 9c)	-					
(87)m=	20.18	20.39	20.63	20.85	20.96	1	21	21	21	20.99	20.8	3 20	.46	20.14		(87)
						<u>ــــــــــــــــــــــــــــــــــــ</u>		· -							I	
•	r	during h		1	i	-		1		· ,					l	(00)
(88)m=	20.11	20.11	20.11	20.12	20.12	20	0.13	20.13	20.14	20.13	20.1	2 20	.12	20.12	1	(88)
Utilisa	ation fac	tor for g	ains for	rest of d	welling,	h2,	m (se	e Table	9a)		_				_	
(89)m=	0.99	0.97	0.92	0.8	0.62	0).43	0.28	0.31	0.53	0.84	0.	97	0.99		(89)
Mean	interna	l temper	ature in	the rest	of dwell	ina	T2 (f	ollow ste	ns 3 to 7	7 in Tabl	le 9c)	-				
(90)m=	19.03	19.33	19.67	19.97	20.09	<u> </u>	0.13	20.13	20.14	20.12	19.9	5 19	.45	18.98		(90)
()						L			-			iving are			0.46	(91)
												Ũ		·	0.10	()
	r	l temper	i È	1	i	<u> </u>		i 1		,					i i	
(92)m=	19.56	19.81	20.11	20.37	20.49		0.53	20.53	20.53	20.52	20.3		.91	19.51		(92)
	adjustr	nent to t	1	1	l temper	1		1			<u> </u>	-			ı.	
(93)m=	19.56	19.81	20.11	20.37	20.49	20	0.53	20.53	20.53	20.52	20.3	5 19	.91	19.51		(93)
		ting requ														
		mean int				ned	at ste	əp 11 of	Table 9t	o, so tha	ıt Ti,m	=(76)n	n an	d re-calc	ulate	
the ut		factor fo	<u> </u>	<u> </u>		1			A	0				D	l	
1.1411:	Jan	Feb	Mar	Apr	May		Jun	Jul	Aug	Sep	Oc	t N	lov	Dec	ł	
	r	tor for g	1	1	0.05		40	0.00	0.05	0.57	0.00		07	0.00	1	(94)
(94)m=	0.99		0.92	0.81	0.65		.46	0.32	0.35	0.57	0.86	0.	97	0.99	Į	(34)
	578.34	hmGm . 687.93	, VV = (94 747.59	ŕ	r Ó		4.46	276.09	289.44	445.58	502 4	0 57	- 10	E 40.00		(95)
(95)m=				726.64	604.23			276.09	269.44	445.56	592.1	0 573	5.19	543.66	Į	(33)
	1y aver 4.3	age exte	6.5	r <u> </u>	11.7	-		16.6	16.4	111	10.6		4	4.2	l	(96)
(96)m=				8.9			4.6	16.6	16.4	14.1		· /	.1	4.2	l	(90)
		e for mea	i	· · · ·	i	-				· ,	ř – –		- 44	4000.44	l	(07)
(97)m=		1079.56	982.28	817.62	625.12		6.69	276.3	289.79	453.08	693.4		5.41	1099.44	ł	(97)
•	r	g require	r	r	i	vvn/ T			_ , ,	,	í –	` r´ -	1.00	440.5	l	
(98)m=	393.6	263.17	174.61	65.51	15.54		0	0	0	0	75.3		1.96	413.5		
									Tota	l per year	(kWh/y	ear) = S	um(9	8)15,912 =	1646.25	(98)
Space	e heatin	g require	ement in	kWh/m²	²/year										22	(99)
9a. <u>En</u>	ergy <u>rec</u>	quiremer	nts <u>– Ind</u> i	ivid <u>ual h</u>	eatin <u>g s</u>	y <u>st</u> e	ems i	ncl <u>uding</u>	mi <u>cro-C</u>	:HP)						
	e heatii															
		bace hea	at from s	econdar	y/supple	eme	ntary	system							0	(201)

Fracti	Fraction of space heat from main system(s) (202) = 1 – (201) =													(202)
Fracti	Fraction of total heating from main system 1 $(204) = (202) \times [1 - (203)] =$													(204)
Efficie	Efficiency of main space heating system 1													(206)
Efficie	Efficiency of secondary/supplementary heating system, %													(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Space		ř	ement (o	calculate	d above)		1				-	1		
	393.6	263.17	174.61	65.51	15.54	0	0	0	0	75.37	244.96	413.5	J	
(211)m		i	r	100 ÷ (20									1	(211)
	420.96	281.47	186.75	70.06	16.62	0	0		0	80.61	261.99 211) _{15,1012}	442.24	1760.69	(211)
= {[(98])m x (20	01)] } x 1	00 ÷ (20	T I									1]()
(215)m=	0	0	0	0	0	0	0	0 Total	0 (k\Wb/yea	0	0 215) _{15,1012}	0		(215)
Wator	heating	۹						Total	(Itter wyoc		2 10) _{15,10} 12	2	0	
	•		ter (calc	ulated al	bove)									
	193.71	170.76	179.37	160.85	157.67	140.94	135.41	148.51	148.23	166.79	176.29	189.07		_
Efficier	ncy of w	ater hea	iter										79.8	(216)
(217)m=		85.96	84.74	82.63	80.66	79.8	79.8	79.8	79.8	82.85	85.69	86.85		(217)
		heating, m x 100												
(219)m=		198.64	211.67	194.67	195.48	176.61	169.69	186.11	185.75	201.32	205.73	217.71]	
							1	Total	= Sum(2	19a) ₁₁₂ =	1		2366.88	(219)
	I totals									k	Wh/year	r	kWh/year	-
Space	heating	fuel use	ed, main	system	1								1760.69	
Water	heating	fuel use	d										2366.88	
Electric	city for p	oumps, f	ans and	electric	keep-ho	t								
centra	al heatir	ng pump	:									30]	(230c
boiler	with a f	an-assis	sted flue									45	ĺ	(230e
Total e	lectricit	y for the	above,	kWh/yea	r			sum	of (230a).	(230g) =	:		75	(231)
Electric	city for l	ighting											327.93	(232)
12a. (CO2 em	issions -	– Individ	lual heati	ing syste	ems inclu	uding mi	cro-CHP						
							ergy /h/year			Emiss kg CO	ion fac 2/kWh	tor	Emissions kg CO2/yea	
Space	heating	(main s	ystem 1)		(21	1) x			0.2	16	=	380.31	(261)
Space	heating	(second	dary)			(21	5) x			0.5	19	=	0	(263)
Water	heating					(219	9) x			0.2	16	=	511.25	_ (264)
Space	and wa	ter heati	ng			(261	1) + (262)	+ (263) + (2	264) =				891.55	(265)
Electric	city for p	oumps, fa	ans and	electric	keep-ho	t (23 ⁻	1) x			0.5	19	=	38.93	_ (267)
Electric	city for l	ighting				(232	2) x			0.5	19	=	170.19	 (268)

Total CO2, kg/year

sum of (265)...(271) =

1100.67 (272)

TER =

1 (203)...(271) =

14.71 (273)