

				User E	Details:						
Assessor Name:	Peter Mitch	nell			Strom	a Num	ber:		STRO	007945	
Software Name:	Stroma FS	AP 201	2			are Ver			Versic	on: 1.0.3.15	
			Р	roperty	Address	: Unit 1 (GF&FF	END) LE	EAN		
Address :	New Dwellir	ng at:, G	ordon H	ouse, 6	Lissend	en Garde	ens, LOI	NDON, M	NW5 1LX	K	
1. Overall dwelling dime	nsions:										
0 14					a(m²)	1	Av. He	ight(m)	7	Volume(m ³	
Ground floor				-	73.62	(1a) x	2	2.4	(2a) =	176.69	(3a)
First floor				6	64.14	(1b) x	3	.32	(2b) =	212.94	(3b)
Total floor area TFA = (1a	a)+(1b)+(1c)+	(1d)+(1e	e)+(1r	I) 1	37.76	(4)					
Dwelling volume						(3a)+(3b))+(3c)+(3d	l)+(3e)+	.(3n) =	389.63	(5)
2. Ventilation rate:											
	main heating		econdar neating	у	other		total			m ³ per hou	r
Number of chimneys	0	+	0	+	0	=	0	X 4	40 =	0	(6a)
Number of open flues	0] + [0] + [0] = [0	x	20 =	0	(6b)
Number of intermittent fai	ns					- F	2	x ′	10 =	20	(7a)
Number of passive vents						Г	0	x ′	10 =	0	(7b)
Number of flueless gas fi	res					Γ	0	x 4	40 =	0	(7c)
									A :=		
	<i>.</i>	(0				_				anges per ho	_
Infiltration due to chimney If a pressurisation test has be						continue fr	$\frac{20}{0m(9) to}$		÷ (5) =	0.05	(8)
Number of storeys in th			eu, proceed	<i>u</i> io (<i>11)</i> ,	ouner wise i	continue in	0111 (9) 10 (10)		0	(9)
Additional infiltration		-)						[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.	.25 for steel or	r timber f	frame or	0.35 fo	r mason	ry constr	uction			0	(11)
if both types of wall are pr			ponding to	the grea	ter wall are	ea (after					
deducting areas of openin If suspended wooden fl			ed) or 0	1 (seale	ed) else	enter 0				0	(12)
If no draught lobby, ent			ou) oi oi	1 (00un	54), 0.00					0	(12)
Percentage of windows			ripped							0	(14)
Window infiltration					0.25 - [0.2	2 x (14) ÷ 1	= [00			0	(15)
Infiltration rate					(8) + (10)	+ (11) + (1	2) + (13) -	+ (15) =		0	(16)
Air permeability value,	q50, expresse	ed in cub	oic metre	s per ho	our per s	quare m	etre of e	nvelope	area	4	(17)
If based on air permeabili	•									0.25	(18)
Air permeability value applies		on test has	s been don	e or a de	gree air pe	rmeability	is being u	sed			
Number of sides sheltere Shelter factor	u				(20) = 1 -	[0.075 x (1	9)] =			3 0.78	(19) (20)
Infiltration rate incorporati	ing shelter fac	tor			(21) = (18) x (20) =				0.19	(21)
Infiltration rate modified for	-		ł								
Jan Feb	Mar Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
Monthly average wind spe	eed from Tabl	e 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	1	



Wind Factor (2)	2a)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		
Adjusted infiltra	ation rat	e (allowi	ing for sh	nelter an	d wind s	peed) =	: (21a) x	(22a)m			-		
0.25	0.24	0.24	0.21	0.21	0.19	0.19	0.18	0.19	0.21	0.22	0.23		
<i>Calcul<mark>ate effec</mark></i> If mechanica		-	rate for t	ne appii	cable ca	se						0	(23a)
If exhaust air he			endix N, (2	3b) = (23a	a) × Fmv (e	equation (I	N5)) , othe	rwise (23b) = (23a)			0	
If balanced with	heat reco	overy: effic	iency in %	allowing f	or in-use fa	actor (fron	n Table 4h) =				0	
a) If balance	d mecha	anical ve	entilation	with he	at recove	ery (MV	HR) (24a	a)m = (2	2b)m + (23b) × [′	1 – (23c)	÷ 100]	
(24a)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24a)
b) If balance	d mecha	anical ve	entilation	without	heat rec	overy (I	MV) (24b)m = (22	2b)m + (23b)			
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24b)
c) If whole ho if (22b)m				-	-				.5 × (23t))			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24c)
d) If natural v if (22b)m									0.5]	•			
(24d)m= 0.53	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53		(24d)
Effective air	change	rate - er	nter (24a) or (24	o) or (24	c) or (24	ld) in boy	k (25)					
(25)m= 0.53	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53		(25)
3. Heat losses	s and he	at loss	paramete	er:									
3. Heat losses	s and he Gros area	S	parameto Openin m	gs	Net Ar A ,r		U-valı W/m2		A X U (W/		k-value kJ/m²-I		A X k kJ/K
	Gros area	S	Openin	gs		n²		K					
ELEMENT	Gros area 1	S	Openin	gs	A ,r	n² x1	W/m2	.0.04] =	(W/				kJ/K
ELEMENT Windows Type	Gros area 1 2	S	Openin	gs	A ,r 5.31	n ² x1	W/m2 /[1/(1.4)+	K 0.04] = 0.04] =	(W/ 7.04				kJ/K (27)
ELEMENT Windows Type Windows Type	Gros area 1 2 3	S	Openin	gs	A ,r 5.31 8.12	n ² x1 x1 x1	W/m2 /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77				kJ/K (27) (27)
ELEMENT Windows Type Windows Type Windows Type	Gros area 1 2 3 4	S	Openin	gs	A ,r 5.31 8.12 2.53	n ² x1 x1 x1 x1 x1	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35				kJ/K (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type	Gros area 1 2 3 4 5	S	Openin	gs	A ,r 5.31 8.12 2.53 2.53	n ² x1 x1 x1 x1 x1 x1 x1 x1	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35 3.35				kJ/K (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type	Gros area 1 2 3 4 5 6	S	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53	n ² x1 x1 x1 x1 x1 x1 x1 x1 x1 x1	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35 3.35 3.35				kJ/K (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type	Gros area 1 2 3 4 5 6 7	S	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53 2.53	n ² x ¹	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35 3.35 3.35 3.35				kJ/K (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type	Gros area 1 2 3 4 5 6 7 8	S	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69	n ² x1 x1 x1 x1 x1 x1 x1 x1 x1 x1 x1 x1	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35 3.35 3.35 3.35 3.35 0.91				kJ/K (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type	Gros area 1 2 3 4 5 6 7 8	S	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27	n ² x ¹	W/m2 /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type	Gros area 1 2 3 4 5 6 7 8	ss (m²)	Openin	gs 2	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42	n ² x ¹	W/m2 /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Rooflights	Gros area 1 2 3 4 5 6 7 8 9	2	Openin	gs 2	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74	n ² x ¹	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W// 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Rooflights	Gros area 1 2 3 4 5 6 7 8 9	2 3	Openin m 28.93	gs ²	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2	n ² x1	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W// 7.04 10.77 3.35 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Rindows Type Windows Type Windows Type Windows Type Rooflights	Gros area 1 2 3 4 5 6 7 8 9 9	2 3 3 3 3 3 3 3 3 3 3 3 3 3	Openin m 28.93	gs ²	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48	n ² x1	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.$	(W// 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92 1.33	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Rooflights Walls Roof Type1 Roof Type2	Gros area 1 2 3 4 5 6 7 8 9 9	2 3 3 3 3 3 3 3 3 3 3 3 3 3	Openin m 28.93	gs ²	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48 58.93	n ² x1	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.$	(W// 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92 1.33	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENT Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Rooflights Walls Roof Type1 Roof Type2 Total area of el	Gros area 1 2 3 4 5 6 7 8 9 9	2 3 3 3 3 3 3 3 3 3 3 3 3 3	Openin m 28.93	gs ²	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48 58.93 228.33	n ² x1	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.$	(W/ 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92 1.33 8.25	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)

* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3 ** include the areas on both sides of internal walls and partitions

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

....

(00)

(00)

.

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



Heat c	apacity	Cm = S((Axk)						((28)	(30) + (32	2) + (32a).	(32e) =	0	(34)
Therm	al mass	parame	ter (TMF	P = Cm -	÷ TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	(35)
	•		ere the de tailed calcu		constructi	ion are noi	t known pr	ecisely the	e indicative	e values of	TMP in Ta	able 1f		
Therm	al bridge	es : S (L	x Y) cal	culated	using Ap	pendix l	K						16.5	(36)
	of therma abric he		are not kn	own (36) =	= 0.15 x (3	1)			(22)	(26) -				
			alculated	lmonthl						(36) =	25)m x (5)		100.24	(37)
ventila	Jan	Feb	Mar	Apr	y May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1	
(38)m=	68.25	68.1	67.95	67.24	67.11	66.49	66.49	66.38	66.73	67.11	67.38	67.66		(38)
	ansfer (coefficier	L					I	(39)m	= (37) + (3	38)m		1	
(39)m=	168.49	168.34	168.19	167.48	167.35	166.73	166.73	166.62	166.97	167.35	167.62	167.9	1	
		meter (H	LLP), W/	<u> </u>		<u> </u>		<u> </u>		L Average = = (39)m ÷	Sum(39)1.	12 /12=	167.48	(39)
(40)m=	1.22	1.22	1.22	1.22	1.21	1.21	1.21	1.21	1.21	1.21	1.22	1.22]	
Numbe	er of dav	rs in mor	nth (Tabl	le 1a)					,	Average =	Sum(40)1.	12 /12=	1.22	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
							•				•		-	
4. Wa	ter heat	ing ener	rgy requi	irement:								kWh/y	ear:	
if TF				[1 - exp	(-0.0003	849 x (TF	FA -13.9))2)] + 0.(0013 x (⁻	TFA -13.		91]	(42)
Reduce	the annua	al average	hot water	usage by		lwelling is	erage = designed t ld)			se target o		3.38]	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
Hot wate					,		Table 1c x						1	
(44)m=	113.71	109.58	105.44	101.31	97.17	93.04	93.04	97.17	101.31	105.44	109.58	113.71]	
Energy (content of	hot water	used - cal	culated mo	onthly = 4.	190 x Vd,r	n x nm x D)) Tm / 3600			m(44) ₁₁₂ = ables 1b, 1		1240.52	(44)
(45)m=	168.63	147.49	152.2	132.69	127.32	109.86	101.81	116.82	118.22	137.77	150.39	163.31]	
lf instan	taneous w	ater heatii	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =	-	1626.52	(45)
(46)m= Water	25.3 storage	22.12	22.83	19.9	19.1	16.48	15.27	17.52	17.73	20.67	22.56	24.5]	(46)
	•		includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0]	(47)
Otherw	vise if no	stored			-) litres in neous co	• •	ers) ente	er '0' in (47)		1	
	storage anufact												•	
,		uiei 3 ue	eclared l	oss facto	or is kno	wn (kvvr	n/day):					0		(48)
Tempe			eclared le m Table		or is kno	wn (kvvr	n/day):					0]	(48) (49)



If com	munity h	age loss leating s from Ta	ee secti		le 2 (kW	h/litre/da	ıy)					0		(51)
		actor fro		2b								0 0		(52) (53)
•		m water			oor			(47) x (51)) y (52) y (53) -		-		(54)
		(54) in (5	-	,	cai			(47) X (31)	/ (() 2) 7 (00) –		0		(54)
	. ,	loss cal	,	for each	month			((56)m = (55) × (41)	m		0		(00)
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
	-	-	-	-	m = (56)m			-	-	-			ix H	(00)
-		r	1	- · ·	r			- · ·	 I	I	0	0		(57)
(57)m=	0	0	0	0	0	0	0	0	0	0		0		
Primar	y circuit		culated	for each	e 3 month (there is s		, ,	• • •		r thermo		0		(58)
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss ca	lculated	for each	month	(61)m =	(60) ÷ 36	65 × (41))m						
(61)m=	50.96	46.03	50.96	49.32	49.52	45.88	47.41	49.52	49.32	50.96	49.32	50.96		(61)
Total h	eat requ	uired for	water he	eating ca	alculated	for eacl	n month	(62)m =	0.85 × ((45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m=	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		(62)
Solar DI	-IW input of	calculated	using App	endix G o	r Appendix	H (negativ	ve quantity	/) (enter '0	' if no sola	r contribut	ion to wate	er heating)		
(add a	dditiona	l lines if	FGHRS	and/or \	WWHRS	applies	, see Ap	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=	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		
								Outp	out from wa	ater heate	r (annual)₁	12	2216.65	(64)
Heat g	ains fro	m water	heating,	kWh/m	onth 0.2	5 ´ [0.85	× (45)m	ı + (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)m]	
(65)m=	68.81	60.55	63.34	56.45	54.71	48	45.7	51.22	51.64	58.55	62.33	67.04		(65)
inclu	ide (57)	m in calo	ulation	of (65)m	only if c	ylinder i	s in the o	dwelling	or hot w	ater is fr	om com	munity h	eating	
5. Int	ternal ga	ains (see	e Table 5	5 and 5a):									
Metab	olic gain	s (Table	5) Wat	ts	,									
motab	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m=	174.76	174.76	174.76	174.76	174.76	174.76	174.76	174.76	174.76	174.76	174.76	174.76		(66)
Lightin	g gains	(calcula	ted in Ap	pendix	L, equat	ion L9 oi	r L9a), a	lso see ⁻	Table 5					
(67)m=	68.39	60.74	49.4	37.4	27.96	23.6	25.5	33.15	44.49	56.49	65.94	70.29		(67)
Applia	nces ga	ins (calc	ulated ir	Append	dix L, eq	uation L	13 or L1	3a), also	see Ta	ble 5				
(68)m=	457.99	462.74	450.76	425.27	393.08	362.84	342.63	337.88	349.85	375.35	407.53	437.78		(68)
Cookir	na aains	(calcula	ted in A	ı ppendix	L, equat	tion L15	or L15a`	i), also se	e Table	5				
(69)m=	55.39	55.39	55.39	55.39	55.39	55.39	55.39	55.39	55.39	55.39	55.39	55.39		(69)
		ns gains												
(70)m=	3	3	3	3	3	3	3	3	3	3	3	3		(70)
					l les) (Tab		-	-	-	-	-	-		× /
(71)m=		· · · · · · · · · · · · · · · · · · ·	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51		(71)
		gains (T												× /
(72)m=	92.49	90.1	85.14	78.4	73.54	66.67	61.43	68.85	71.72	78.7	86.57	90.11		(72)
(12)11-	52.43	50.1	00.14	L ' ^{0.4}	, 0.04	00.07	51.45	00.00	, Z	, 0.7	00.07	50.11		(· -/



Total internal	gains =				(6	6)m + (67)n	n + (68	3)m +	(69)m + (70)m +	(71)m + (72)	m		
(73)m= 735.51	730.22	701.95	657.71	611.22	569.75	546.2	556	.52	582.7	627.18	676.68	714.82]	(73)
6. Solar gains	S:						-	-						
Solar gains are o	calculated	using sola	r flux from	Table 6a	and asso	ciated equa	ations	to cor	nvert to the	e applica		ion.		
Orientation: A	∖ccess F Γable 6d	actor	Area m²	l		ux able 6a			g_ able 6b		FF Table 6c		Gains (W)	
-								- i c					(**)	
Northeast 0.9x	0.77	x	2.5	53	×	11.28	X		0.76	_ ×	0.7	=	10.52	(75)
Northeast 0.9x	0.77	x	2.5	53	×	11.28	X		0.76	_ ×	0.7	=	10.52	(75)
Northeast 0.9x	0.77	x	2.5	53	x	11.28	X		0.76	_ ×	0.7	=	10.52	(75)
Northeast 0.9x	0.77	x	2.5	53	×	11.28	X		0.76	_ ×	0.7	=	10.52	(75)
Northeast 0.9x	0.77	x	2.5	53	x	22.97	x		0.76	_ ×	0.7	=	21.42	(75)
Northeast 0.9x	0.77	x	2.5	53	x	22.97	X		0.76	×	0.7	=	21.42	(75)
Northeast 0.9x	0.77	x	2.5	53	x	22.97	x		0.76	×	0.7	=	21.42	(75)
Northeast 0.9x	0.77	x	2.5	53	x	22.97	x		0.76	×	0.7	=	21.42	(75)
Northeast 0.9x	0.77	x	2.5	53	x	41.38	x		0.76	×	0.7	=	38.6	(75)
Northeast 0.9x	0.77	x	2.5	53	x	41.38	x		0.76	×	0.7	=	38.6	(75)
Northeast 0.9x	0.77	x	2.5	53	x	41.38	x		0.76	x	0.7	=	38.6	(75)
Northeast 0.9x	0.77	x	2.5	53	x	41.38	x		0.76	x	0.7	=	38.6	(75)
Northeast 0.9x	0.77	x	2.5	53	x	67.96	x		0.76	x	0.7	=	63.39	(75)
Northeast 0.9x	0.77	x	2.5	53	x	67.96	x		0.76	×	0.7	=	63.39	(75)
Northeast 0.9x	0.77	x	2.5	53	x	67.96	x		0.76	x	0.7	=	63.39	(75)
Northeast 0.9x	0.77	x	2.5	53	x	67.96	x		0.76	x	0.7	=	63.39	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.35	x		0.76	x	0.7	=	85.2	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.35	x		0.76	x	0.7	=	85.2	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.35	x		0.76	x	0.7	=	85.2	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.35	x		0.76	x	0.7	=	85.2	(75)
Northeast 0.9x	0.77	x	2.5	53	x	97.38	x		0.76	x	0.7	=	90.84	(75)
Northeast 0.9x	0.77	x	2.5	53	x	97.38	x		0.76	x	0.7	=	90.84	(75)
Northeast 0.9x	0.77	x	2.5	53	x	97.38	x		0.76	×	0.7	=	90.84	(75)
Northeast 0.9x	0.77	x	2.5	53	x	97.38	x		0.76	×	0.7	=	90.84	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.1	x		0.76	×	0.7	=	84.97	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.1	x		0.76	×	0.7	=	84.97	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.1	x		0.76	_ x [0.7	=	84.97	(75)
Northeast 0.9x	0.77	x	2.5	53	x	91.1	x		0.76	×	0.7	=	84.97	(75)
Northeast 0.9x	0.77	x	2.5	53	x	72.63	x		0.76		0.7	=	67.74	(75)
Northeast 0.9x	0.77	x	2.5	53	x 🗌	72.63	x		0.76		0.7	=	67.74	(75)
Northeast 0.9x	0.77	x	2.5	53	x 🗌	72.63	x		0.76	×	0.7		67.74	(75)
Northeast 0.9x	0.77	x	2.5		x	72.63	x		0.76	×	0.7		67.74	(75)
Northeast 0.9x	0.77	x	2.5		x	50.42	x		0.76	×	0.7	=	47.03	(75)
Northeast 0.9x	0.77	x	2.5		x	50.42	x		0.76		0.7	=	47.03	(75)
L			L		L		1	L					ļ	

Northesst 0.00 0.77 × 2.53 × 0.042 × 0.76 × 0.77 = 47.05 (15) Northeast 0.90 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 75 Northeast 0.90 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 75 Northeast 0.90 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 (75) Northeast 0.90 0.77 × 2.53 × 1.42 × 0.76 × 0.77 = 1.3.24 (75) Northeast 0.90 0.77 × 2.53 × 1.42 × 0.76 × 0.77 = 8.59 (75) Northeast 0.90 0.77 × 2.53 × 9.21 × 0.76 × 0.77 <td< th=""><th>Northeast 0.9x</th><th>0.77</th><th>) x</th><th>2.53</th><th>] x</th><th>50.42</th><th>) ×</th><th>0.76</th><th>x</th><th>0.7</th><th>=</th><th>47.03</th><th>(75)</th></td<>	Northeast 0.9x	0.77) x	2.53] x	50.42) ×	0.76	x	0.7	=	47.03	(75)
Northeast 0.5% 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.011 (f) Northeast 0.5% 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 (75) Northeast 0.5% 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 (75) Northeast 0.5% 0.77 × 2.53 × 1.42 × 0.76 × 0.77 = 2.618 (75) Northeast 0.5% 0.77 × 2.53 × 1.42 × 0.76 × 0.77 = 8.59 (75) Northeast 0.5% 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Southwest0.5% 0.77 × 2.53 × 9.21 × 0.76 × 0.77	L] 1] 1	50.42] 1						4
Northeast 0.9x 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.818 (15) Northeast 0.9x 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.818 (15) Northeast 0.9x 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 13.24 (15) Northeast 0.9x 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 13.24 (15) Northeast 0.9x 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 8.59 (15) Northeast 0.9x 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (15) Southwest 0.9x 0.77 × 2.53 × 9.26 0.76 × 0.77 = <td< td=""><td>L</td><td></td><td>] 1</td><td></td><td>J 1</td><td></td><td>] 1</td><td></td><td>1</td><td></td><td></td><td></td><td>4</td></td<>	L] 1		J 1] 1		1				4
Northeast 0.5x 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 (f) Northeast 0.5x 0.77 × 2.53 × 2.807 × 0.76 × 0.77 = 2.618 (f) Northeast 0.5x 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 13.24 (f) Northeast 0.5x 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 13.24 (f) Northeast 0.5x 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 8.59 (f) Northeast 0.5x 0.77 × 2.53 × 0.21 × 0.76 × 0.77 = 8.59 (f) Southwest0.5x 0.77 × 5.31 × 62.67 0.76 × 0.77 = 8.507	L] 1] 1] 1		1				4
Northeast 0.9x 0.77 × 2.6.1 × 0.76 × 0.77 × 2.6.1 (°) Northeast 0.9x 0.77 × 2.6.3 × 14.2 × 0.76 × 0.77 = 13.24 (°) Northeast 0.9x 0.77 × 2.5.3 × 14.2 × 0.76 × 0.77 = 13.24 (°) Northeast 0.9x 0.77 × 2.5.3 × 14.2 × 0.76 × 0.77 = 8.59 (°) Northeast 0.9x 0.77 × 2.5.3 × 9.21 × 0.76 × 0.77 = 8.59 (°) Northeast 0.9x 0.77 × 2.5.3 × 9.21 × 0.76 × 0.77 = 8.59 (°) Southwest0.9x 0.77 × 6.31 × 36.79 0.76 × 0.77 = 46.39 (°) <td< td=""><td>L</td><td></td><td>1</td><td></td><td>1</td><td></td><td>] 1</td><td></td><td></td><td></td><td></td><td></td><td>4</td></td<>	L		1		1] 1						4
Northeast 0.ax 0.77 x 2.53 x 14.2 x 0.76 x 0.77 = 13.24 (75) Northeast 0.ax 0.77 x 2.53 x 14.2 x 0.76 x 0.77 = 13.24 (75) Northeast 0.ax 0.77 x 2.53 x 14.2 x 0.76 x 0.77 = 13.24 (75) Northeast 0.ax 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Northeast 0.ax 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Northeast 0.ax 0.77 x 5.31 x 36.79 0.76 x 0.77 = 10.516 (79) Southwest0.ax 0.77 x 5.31 x 66.76 0.76 x 0.77 = 10.62	L		1] 1] 1		1				4
Northeast 0 # 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 13.24 (75) Northeast 0 # 0.77 × 2.53 × 14.2 × 0.76 × 0.7 = 13.24 (75) Northeast 0 # 0.77 × 2.53 × 9.21 × 0.76 × 0.7 = 8.59 (75) Northeast 0 # 0.77 × 2.53 × 9.21 × 0.76 × 0.7 = 8.59 (75) Northeast 0 # 0.77 × 2.53 × 9.21 × 0.76 × 0.7 = 8.59 (75) Northeast 0 # 0.77 × 5.31 × 36.79 0.76 × 0.7 = 110.15 (79) Southwest0 # 0.77 × 5.31 × 62.67 0.76 × 0.7 = 12.2.68 (79) <td>L</td> <td></td> <td>1 1</td> <td>Г</td> <td>] 1</td> <td></td> <td>] 1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>4</td>	L		1 1	Г] 1] 1						4
Northeast 0.sk 0.77 × 2.53 × 14.2 × 0.76 × 0.77 = 13.24 (75) Northeast 0.sk 0.77 × 2.53 × 9.21 × 0.76 × 0.7 = 8.59 (75) Northeast 0.sk 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Northeast 0.sk 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Northeast 0.sk 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Southwesto sk 0.77 × 8.12 × 36.79 0.76 × 0.7 = 110.15 (79) Southwesto sk 0.77 × 8.12 × 62.67 0.76 × 0.7 = 122.60	L] 1] 1] 1						4
Northeast 0.9k 0.77 x 2.53 x 14.2 x 0.76 x 0.77 = 13.24 (75) Northeast 0.9k 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Northeast 0.9k 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Northeast 0.9k 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Southwesto.9k 0.77 x 5.31 x 36.79 0.76 x 0.77 = 10.15 (79) Southwesto.9k 0.77 x 6.12 x 36.79 0.76 x 0.7 = 146.39 (79) Southwesto.9k 0.77 x 5.31 x 62.67 0.76 x 0.7 = 147.68 (79)	L] 1] 1] 1		1				4
Northeast 0.5k 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Northeast 0.5k 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Northeast 0.5k 0.77 × 2.53 × 9.21 × 0.76 × 0.77 = 8.59 (75) Southwest0.5k 0.77 × 5.31 × 36.79 0.76 × 0.77 = 110.15 (79) Southwest0.5k 0.77 × 5.31 × 62.67 0.76 × 0.77 = 147.62 (79) Southwest0.5k 0.77 × 6.12 × 62.67 0.76 × 0.77 = 19.02 (79) Southwest0.5k 0.77 × 6.12 × 62.67 0.76 × 0.77 = 19.02 (79)	L] 1] 1] 1						4
Northeast 0.9x 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Northeast 0.9x 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 8.59 (75) Southwest 0.9x 0.77 x 5.31 x 36.79 0.76 x 0.77 = 110.15 (79) Southwest 0.9x 0.77 x 5.31 x 66.267 0.76 x 0.77 = 46.39 (79) Southwest 0.9x 0.77 x 5.31 x 62.67 0.76 x 0.77 = 46.39 (79) Southwest 0.9x 0.77 x 5.31 x 62.67 0.76 x 0.77 = 167.88 (79) Southwest 0.9x 0.77 x 8.12 x 165.25 0.76 x 0.77 = 168.62 (79) Sou	L] 1] 1] 1		1				4
Northeast 0.9x 0.77 x 2.53 x 9.21 x 0.76 x 0.77 x 2.53 x 9.21 x 0.76 x 0.77 x 2.53 x 9.21 x 0.76 x 0.77 x 6.51 (75) Southwesto.9x 0.77 x 5.31 x 36.79 0.76 x 0.77 = 110.15 (79) Southwesto.9x 0.77 x 5.31 x 62.67 0.76 x 0.77 = 112.69 (79) Southwesto.9x 0.77 x 5.31 x 62.67 0.76 x 0.77 = 117.82 (79) Southwesto.9x 0.77 x 5.31 x 62.67 0.76 x 0.77 = 1167.82 (79) Southwesto.9x 0.77 x 5.31 x 106.25 0.76 x 0.77 108.12 (79) <	L		1] 1] 1		1				4
Northeast 0.9x 0.77 x 2.53 x 9.21 x 0.76 x 0.77 = 6.59 (75) Southwesto.9x 0.77 x 5.31 x 36.79 0.76 x 0.77 = 110.15 (79) Southwesto.9x 0.77 x 8.12 x 36.79 0.76 x 0.77 = 110.15 (79) Southwesto.9x 0.77 x 5.31 x 62.67 0.76 x 0.7 = 142.69 (79) Southwesto.9x 0.77 x 8.12 x 62.67 0.76 x 0.7 = 147.62 (79) Southwesto.9x 0.77 x 8.12 x 62.67 0.76 x 0.7 = 167.88 (79) Southwesto.9x 0.77 x 8.12 x 85.75 0.76 x 0.7 = 108.12 (79) Southwesto.9x <t< td=""><td>L</td><td></td><td>1</td><td>Г</td><td>] 1</td><td></td><td>] 1</td><td></td><td></td><td></td><td></td><td></td><td>4</td></t<>	L		1	Г] 1] 1						4
Southwesto.gx 0.77 x 5.31 x 36.79 0.76 x 0.77 = 110.15 (79) Southwesto.gx 0.77 x 8.12 x 36.79 0.76 x 0.77 = 110.15 (79) Southwesto.gx 0.77 x 8.12 x 36.79 0.76 x 0.77 = 110.15 (79) Southwesto.gx 0.77 x 5.31 x 62.67 0.76 x 0.7 = 112.69 (79) Southwesto.gx 0.77 x 8.12 x 62.67 0.76 x 0.7 = 112.69 (79) Southwesto.gx 0.77 x 5.31 x 85.75 0.76 x 0.7 = 116.88 (79) Southwesto.gx 0.77 x 8.12 x 106.25 0.76 x 0.7 = 108.12 (79) Southwesto.gx 0.77	L] 1] 1] 1						4
Southwest 0.77 × 8.12 × 36.79 0.76 × 0.7 = 110.15 (79) Southwest 0.77 × 6.31 × 62.67 0.76 × 0.7 = 46.39 (79) Southwest 0.77 × 6.31 × 62.67 0.76 × 0.7 = 112.269 (79) Southwest 0.9 0.77 × 8.12 × 62.67 0.76 × 0.7 = 178.62 (79) Southwest 0.9 0.77 × 5.31 × 85.75 0.76 × 0.7 = 167.88 (79) Southwest 0.9 0.77 × 8.12 × 85.75 0.76 × 0.7 = 168.12 (79) Southwest 0.9 0.77 × 8.12 × 85.75 0.76 × 0.7 = 168.12 (79) Southwest 0.9 0.77 × 8.12 × 166.25 0.76 × 0.7 = 126.671 (79) Southwest 0.77 × 8.12 × 110.625 0.76 × 0.7 = 138.97 (79) Southwest 0.77 × 8.12 × 110.625 0.76 × 0.7 = 132.97 (79) Southwest 0.77 × 8.12 × 110.91 0.76 × 0.7 = 122.98 (79) Southwest 0.77 × <td>L</td> <td></td> <td>1 1</td> <td></td> <td>] 1</td> <td></td> <td>X 1</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td>4</td>	L		1 1] 1		X 1		1				4
Southwest 0.77 \times 3.42 \times 36.79 0.76 \times 0.7 $=$ 46.39 (7) Southwest 0.77 \times 5.31 \times 62.67 0.76 \times 0.7 $=$ 1122.69 (7) Southwest $0.9\times$ 0.77 \times 8.12 \times 62.67 0.76 \times 0.7 $=$ 1122.69 (7) Southwest $0.9\times$ 0.77 \times 8.12 \times 62.67 0.76 \times 0.7 $=$ 1187.62 (7) Southwest $0.9\times$ 0.77 \times 6.31 \times 85.75 0.76 \times 0.7 $=$ 256.71 (7) Southwest $0.9\times$ 0.77 \times 8.12 \times 85.75 0.76 \times 0.7 $=$ 206.01 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 106.25 0.76 \times 0.7 $=$ 208.01 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 106.25 0.76 \times 0.7 $=$ 232.98 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 106.25 0.76 \times 0.7 $=$ 232.98 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 110.01 0.76 \times 0.7 $=$ 232.98 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times	L		1		ן 1]		1				4
Southwesto 9x 0.77 x 5.31 x 62.87 0.76 x 0.7 x 62.87 Southwesto 9x 0.77 x 8.12 x 62.87 0.76 x 0.7 = 1187.62 (7) Southwesto 9x 0.77 x 3.42 x 62.67 0.76 x 0.7 = 1187.62 (7) Southwesto 9x 0.77 x 5.31 x 85.75 0.76 x 0.7 = 1167.88 (79) Southwesto 9x 0.77 x 3.42 x 85.75 0.76 x 0.7 = 208.01 (79) Southwesto 9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 208.01 (79) Southwesto 9x 0.77 x 3.42 x 106.25 0.76 x 0.7 = 232.98 (79) Southwesto 9x 0.77 x <	L	0.77	X	8.12	X	36.79]	0.76	X	0.7	=	110.15	4
Southwesto, 9x 0.77 x 8.12 x 62.67 0.76 x 0.77 = 187.62 (79) Southwesto, 9x 0.77 x 3.42 x 62.67 0.76 x 0.77 = 187.62 (79) Southwesto, 9x 0.77 x 5.31 x 86.75 0.76 x 0.77 = 187.62 (79) Southwesto, 9x 0.77 x 8.12 x 86.75 0.76 x 0.7 = 187.62 (79) Southwesto, 9x 0.77 x 8.12 x 86.75 0.76 x 0.7 = 226.71 (79) Southwesto, 9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 318.08 (79) Southwesto, 9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 339.7 (79) Southwesto, 9x 0.77 </td <td>Ļ</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td>]</td> <td>0.76</td> <td>X</td> <td></td> <td>=</td> <td></td> <td>-</td>	Ļ		1		1]	0.76	X		=		-
Southwest 0.77 x 3.42 x 62.67 0.76 x 0.77 z 5.31 x 86.75 0.76 x 0.77 z 62.671 (79) Southwest $9x$ 0.77 x 85.75 0.76 x 0.77 z 62.671 (79) Southwest $9x$ 0.77 x 85.75 0.76 x 0.77 z 62.671 (79) Southwest $9x$ 0.77 x 84.75 0.76 x 0.77 z 226.71 (79) Southwest $9x$ 0.77 x 84.2 x 88.75 0.76 x 0.77 z 208.01 (79) Southwest $9x$ 0.77 x 81.2 x 106.25 0.76 x 0.77 z 208.01 (79) Southwest $9x$ 0.77 x 81.2 x 106.25 0.76 x 0.77 z 232.98 (79) Southwest $9x$ 0.77 x 81.2 x 119.01 0.76 x 0.77 z 232.98 (79) Southwest $9x$ 0.77 x 81.2 x 119.01 0.76 x 0.77 z 362.29 (79) Southwest $9x$ 0.77 x 81.2 x 119.01 0.76 x 0.77 z 362.29 (79) Southwest $9x$ 0.77 x 81	L	0.77	X	Г	X]		X	0.7	=		4
Southwest0.9x 0.77 x 5.31 x 85.75 0.76 x 0.77 = 167.88 (79) Southwest0.9x 0.77 x 8.12 x 85.75 0.76 x 0.7 = 256.71 (79) Southwest0.9x 0.77 x 5.31 x 106.25 0.76 x 0.7 = 208.01 (79) Southwest0.9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 208.01 (79) Southwest0.9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 110.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 118.01 0.76 x 0.7 = 231.3 (79) Southwest0.9x 0.77 x 8.12	L	0.77	X	8.12	X	62.67]	0.76	X	0.7	=	187.62	4
Southwesto $3x$ 0.77x0.77colspan="6">colspan="6" colspan="6">colspan="6" colspan="6" c	L	0.77	X	3.42	X	62.67		0.76	X	0.7	=	79.02	-
Southwest0.9x 0.77 x 3.42 x 85.75 0.76 x 0.7 = 108.12 (79) Southwest0.9x 0.77 x 5.31 x 106.25 0.76 x 0.7 = 208.01 (79) Southwest0.9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 218.08 (79) Southwest0.9x 0.77 x 3.42 x 106.25 0.76 x 0.7 = 131.97 (79) Southwest0.9x 0.77 x 5.31 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwest0.9x 0.77 x 8.12 x 118.15 0.76 x 0.7 = 231.3 (79) Southwest0.9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 223 (79) Southwest0.9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 244.36 (79) Southwest0.9x 0.77 x 8.12 x </td <td>L</td> <td>0.77</td> <td>X</td> <td>5.31</td> <td>X</td> <td>85.75</td> <td></td> <td>0.76</td> <td>X</td> <td>0.7</td> <td>=</td> <td>167.88</td> <td>4</td>	L	0.77	X	5.31	X	85.75		0.76	X	0.7	=	167.88	4
Southwesto,9x 0.77 x 5.31 x 106.25 0.76 x 0.7 = 208.01 (79) Southwesto,9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 318.08 (79) Southwesto,9x 0.77 x 3.42 x 106.25 0.76 x 0.7 = 133.97 (79) Southwesto,9x 0.77 x 5.31 x 119.01 0.76 x 0.7 = 232.98 (79) Southwesto,9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwesto,9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwesto,9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwesto,9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 231.3 (79) Southwesto,9x 0.77 x 8.12 x 118.15 0.76 x 0.7 = 231.3 (79) Southwesto,9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 223 (79) Southwesto,9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 243.6 (79) Southwesto,9x 0.77 x 8.12 x <td>L</td> <td>0.77</td> <td>×</td> <td>8.12</td> <td>×</td> <td>85.75</td> <td> </td> <td>0.76</td> <td>X</td> <td>0.7</td> <td>=</td> <td>256.71</td> <td>(79)</td>	L	0.77	×	8.12	×	85.75		0.76	X	0.7	=	256.71	(79)
Southwesto,9x 0.77 x 8.12 x 106.25 0.76 x 0.7 = 318.08 (79) Southwesto,9x 0.77 x 3.42 x 106.25 0.76 x 0.7 = 133.97 (79) Southwesto,9x 0.77 x 5.31 x 119.01 0.76 x 0.7 = 232.98 (79) Southwesto,9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 232.98 (79) Southwesto,9x 0.77 x 8.12 x 119.01 0.76 x 0.7 = 2356.28 (79) Southwesto,9x 0.77 x 5.31 x 118.15 0.76 x 0.7 = 231.3 (79) Southwesto,9x 0.77 x 8.12 x 118.15 0.76 x 0.7 = 235.7 (79) Southwesto,9x 0.77 x 8.12 x 118.15 0.76 x 0.7 = 148.97 (79) Southwesto,9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 241.479 Southwesto,9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 244.679 Southwesto,9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 244.679 Southwesto,9x 0.77 x 8.12 x 104.39 0.76 <td< td=""><td>Ļ</td><td>0.77</td><td>×</td><td>3.42</td><td>×</td><td>85.75</td><td> </td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>108.12</td><td>(79)</td></td<>	Ļ	0.77	×	3.42	×	85.75		0.76	x	0.7	=	108.12	(79)
Southwest 0.77 \times 3.42 \times 106.25 0.76 \times 0.7 $=$ 133.97 (79) Southwest 0.77 \times 5.31 \times 119.01 0.76 \times 0.7 $=$ 232.98 (79) Southwest 0.77 \times 8.12 \times 119.01 0.76 \times 0.7 $=$ 232.98 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 119.01 0.76 \times 0.7 $=$ 356.28 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 119.01 0.76 \times 0.7 $=$ 231.3 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 118.15 0.76 \times 0.7 $=$ 233.7 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 118.15 0.76 \times 0.7 $=$ 233.7 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 113.91 0.76 \times 0.7 $=$ 243.7 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 243.6 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 243.6 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 104.39	L	0.77	x	5.31	x	106.25	ļ	0.76	x	0.7	=	208.01	(79)
Note to the set of the set	L	0.77	x	8.12	x	106.25	ļ	0.76	x	0.7	=	318.08	(79)
Southwest 0.77 \times 8.12 \times 119.01 0.76 \times 0.7 $=$ 336.28 (79) Southwest 0.77 \times 3.42 \times 119.01 0.76 \times 0.7 $=$ 150.06 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 118.15 0.76 \times 0.7 $=$ 231.3 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 118.15 0.76 \times 0.7 $=$ 233.7 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 118.15 0.76 \times 0.7 $=$ 148.97 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 113.91 0.76 \times 0.7 $=$ 223 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 241.62 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 243.62 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 214.362 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 214.362 (79) Southwest $0.9x$ 0.77 \times 8.12 \times <td>L</td> <td>0.77</td> <td>x</td> <td>3.42</td> <td>x</td> <td>106.25</td> <td></td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>133.97</td> <td>(79)</td>	L	0.77	x	3.42	x	106.25		0.76	x	0.7	=	133.97	(79)
Southwest 0.77 \times 3.42 \times 119.01 0.76 \times 0.7 $=$ 150.06 (79) Southwest 0.77 \times 5.31 \times 118.15 0.76 \times 0.7 $=$ 231.3 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 118.15 0.76 \times 0.7 $=$ 233.7 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 118.15 0.76 \times 0.7 $=$ 353.7 (79) Southwest $0.9\times$ 0.77 \times 5.31 \times 113.91 0.76 \times 0.7 $=$ 223 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 241.4 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 243.62 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 204.36 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 212.51 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 131.62 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times <td< td=""><td>L</td><td>0.77</td><td>x</td><td>5.31</td><td>x</td><td>119.01</td><td></td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>232.98</td><td>(79)</td></td<>	L	0.77	x	5.31	x	119.01		0.76	x	0.7	=	232.98	(79)
Southwest0.9x 0.77 x 5.31 x 118.15 0.76 x 0.7 = 231.3 (79) Southwest0.9x 0.77 x 8.12 x 118.15 0.76 x 0.7 = 235.7 (79) Southwest0.9x 0.77 x 3.42 x 118.15 0.76 x 0.7 = 353.7 (79) Southwest0.9x 0.77 x 5.31 x 113.91 0.76 x 0.7 = 223 (79) Southwest0.9x 0.77 x 5.31 x 113.91 0.76 x 0.7 = 234.1 (79) Southwest0.9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 341 (79) Southwest0.9x 0.77 x 5.31 x 104.39 0.76 x 0.7 = 143.62 (79) Southwest0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 212.51 (79) Southwest0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 312.51 (79) Southwest0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 131.62 (79) Southwest0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 181.77 (79) Southwest0.9x 0.77 x 8.12 x <td< td=""><td>L</td><td>0.77</td><td>x</td><td>8.12</td><td>x</td><td>119.01</td><td></td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>356.28</td><td>(79)</td></td<>	L	0.77	x	8.12	x	119.01		0.76	x	0.7	=	356.28	(79)
Southwest0.9x 0.77 x 8.12 x 118.15 0.76 x 0.7 = 353.7 (79) Southwest0.9x 0.77 x 3.42 x 118.15 0.76 x 0.7 = 148.97 (79) Southwest0.9x 0.77 x 5.31 x 113.91 0.76 x 0.7 = 223 (79) Southwest0.9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 223 (79) Southwest0.9x 0.77 x 8.12 x 113.91 0.76 x 0.7 = 341 (79) Southwest0.9x 0.77 x 5.31 x 104.39 0.76 x 0.7 = 204.36 (79) Southwest0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 312.51 (79) Southwest0.9x 0.77 x 3.42 x 104.39 0.76 x 0.7 = 312.51 (79) Southwest0.9x 0.77 x 3.42 x 104.39 0.76 x 0.7 = 131.62 (79) Southwest0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 181.77 (79) Southwest0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 181.77 (79) Southwest0.9x 0.77 x 8.12 x	L	0.77	x	3.42	x	119.01		0.76	x	0.7	=	150.06	(79)
Southwest 0.77 \times 3.42 \times 118.15 0.76 \times 0.7 $=$ 148.97 (79) Southwest $0.9\times$ 0.77 \times 5.31 \times 113.91 0.76 \times 0.7 $=$ 223 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 223 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 341 (79) Southwest $0.9\times$ 0.77 \times 3.42 \times 113.91 0.76 \times 0.7 $=$ 143.62 (79) Southwest $0.9\times$ 0.77 \times 5.31 \times 104.39 0.76 \times 0.7 $=$ 204.36 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 131.62 (79) Southwest $0.9\times$ 0.77 \times 3.42 \times 104.39 0.76 \times 0.7 $=$ 131.62 (79) Southwest $0.9\times$ 0.77 \times 5.31 \times 92.85 0.76 \times 0.7 $=$ 181.77 (79) Southwest $0.9\times$ 0.77 \times 8.12 \times 92.85 0.76 \times 0.7 $=$ 277.97 (79) Southwest $0.9\times$ 0.77 \times 8.12	L	0.77	x	5.31	x	118.15		0.76	x	0.7	=	231.3	(79)
Southwest 0.77 \times 5.31 \times 113.91 0.76 \times 0.7 $=$ 223 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 113.91 0.76 \times 0.7 $=$ 341 (79) Southwest $0.9x$ 0.77 \times 3.42 \times 113.91 0.76 \times 0.7 $=$ 341 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 104.39 0.76 \times 0.7 $=$ 204.36 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 104.39 0.76 \times 0.7 $=$ 312.51 (79) Southwest $0.9x$ 0.77 \times 3.42 \times 104.39 0.76 \times 0.7 $=$ 312.51 (79) Southwest $0.9x$ 0.77 \times 5.31 \times 92.85 0.76 \times 0.7 $=$ 181.77 (79) Southwest $0.9x$ 0.77 \times 8.12 \times 92.85 0.76 \times 0.7 $=$ 277.97 (79)	L	0.77	x	8.12	x	118.15		0.76	x	0.7	=	353.7	(79)
Southwest Southwest 0.9x 0.77 x 8.12 x 113.91 0.76 x 0.7 $=$ 341 (79) Southwest 0.9x 0.77 x 3.42 x 113.91 0.76 x 0.7 $=$ 143.62 (79) Southwest 0.9x 0.77 x 5.31 x 104.39 0.76 x 0.7 $=$ 204.36 (79) Southwest 0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 $=$ 204.36 (79) Southwest 0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 $=$ 312.51 (79) Southwest 0.9x 0.77 x 3.42 x 104.39 0.76 x 0.7 $=$ 131.62 (79) Southwest 0.9x 0.77 x 5.31 x 92.85 0.76 x 0.7 $=$ 181.77 (79) Southwest 0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 $=$ 277.97 (79)	Southwest _{0.9x}	0.77	x	3.42	x	118.15]	0.76	x	0.7	=	148.97	(79)
Southwest 0.9x 0.77 x 3.42 x 113.91 0.76 x 0.77 = 143.62 (79) Southwest 0.9x 0.77 x 5.31 x 104.39 0.76 x 0.7 = 204.36 (79) Southwest 0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 204.36 (79) Southwest 0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 312.51 (79) Southwest 0.9x 0.77 x 3.42 x 104.39 0.76 x 0.7 = 131.62 (79) Southwest 0.9x 0.77 x 5.31 x 92.85 0.76 x 0.7 = 181.77 (79) Southwest 0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 277.97 (79)	Southwest0.9x	0.77	x	5.31	x	113.91]	0.76	x	0.7	=	223	(79)
Southwest 0.9x 0.77 x 5.31 x 104.39 0.76 x 0.7 = 204.36 (79) Southwest 0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 312.51 (79) Southwest 0.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 312.51 (79) Southwest 0.9x 0.77 x 3.42 x 104.39 0.76 x 0.7 = 131.62 (79) Southwest 0.9x 0.77 x 5.31 x 92.85 0.76 x 0.7 = 181.77 (79) Southwest 0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 277.97 (79)	Southwest _{0.9x}	0.77	x	8.12	x	113.91		0.76	x	0.7	=	341	(79)
Southwesto.9x 0.77 x 8.12 x 104.39 0.76 x 0.7 = 312.51 (79) Southwesto.9x 0.77 x 3.42 x 104.39 0.76 x 0.7 = 312.51 (79) Southwesto.9x 0.77 x 5.31 x 92.85 0.76 x 0.7 = 131.62 (79) Southwesto.9x 0.77 x 5.31 x 92.85 0.76 x 0.7 = 181.77 (79) Southwesto.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 277.97 (79)	Southwest0.9x	0.77	x	3.42	x	113.91]	0.76	x	0.7	=	143.62	(79)
Southwest 0.9x 0.77 x 3.42 x 104.39 0.76 x 0.77 = 131.62 (79) Southwest 0.9x 0.77 x 5.31 x 92.85 0.76 x 0.7 = 181.77 (79) Southwest 0.9x 0.77 x 8.12 x 92.85 0.76 x 0.7 = 181.77 (79)	Southwest _{0.9x}	0.77	x	5.31	x	104.39]	0.76	x	0.7	=	204.36	(79)
Southwest 0.9x0.77x5.31x92.850.76x0.7=181.77(79)Southwest 0.9x0.77x8.12x92.850.76x0.7=277.97(79)	Southwest _{0.9x}	0.77	x	8.12	x	104.39]	0.76	×	0.7	=	312.51	(79)
Southwest _{0.9x} 0.77 x 8.12 x 92.85 0.76 x 0.7 = 277.97 (79)	Southwest _{0.9x}	0.77	x	3.42	x	104.39]	0.76	x	0.7	=	131.62	(79)
	Southwest _{0.9x}	0.77	x	5.31	x	92.85]	0.76	x	0.7	=	181.77	(79)
Southwest _{0.9x} 0.77 x 3.42 x 92.85 0.76 x 0.7 = 117.07 (79)	Southwest _{0.9x}	0.77	×	8.12	x	92.85]	0.76	x	0.7	=	277.97	(79)
	Southwest _{0.9x}	0.77	x	3.42	x	92.85]	0.76	x	0.7	=	117.07	(79)



Southwest0.9x	0.77	x	5.31	x	69.27		0.76	x	0.7	=	135.6	(79)
Southwest _{0.9x}	0.77	x	8.12	x	69.27	İ	0.76	x	0.7	=	207.36	(79)
Southwest _{0.9x}	0.77	x	3.42	x	69.27	Ì	0.76	x	0.7	=	87.34	(79)
Southwest _{0.9x}	0.77	x	5.31	x	44.07		0.76	x	0.7	=	86.28	(79)
Southwest _{0.9x}	0.77	x	8.12	x	44.07		0.76	x	0.7	=	131.93	(79)
Southwest _{0.9x}	0.77	x	3.42	x	44.07		0.76	x	0.7	=	55.57	(79)
Southwest0.9x	0.77	x	5.31	x	31.49		0.76	x	0.7	=	61.64	(79)
Southwest0.9x	0.77	×	8.12	x	31.49		0.76	x	0.7	=	94.26	(79)
Southwest0.9x	0.77	x	3.42	x	31.49		0.76	x	0.7	=	39.7	(79)
Northwest 0.9x	0.77	x	0.69	x	11.28	×	0.76	x	0.7	=	2.87	(81)
Northwest 0.9x	0.77	×	1.27	x	11.28	×	0.76	x	0.7	=	5.28	(81)
Northwest 0.9x	0.77	×	0.69	x	22.97	x	0.76	x	0.7	=	5.84	(81)
Northwest 0.9x	0.77	x	1.27	x	22.97	×	0.76	x	0.7	=	10.75	(81)
Northwest 0.9x	0.77	×	0.69	x	41.38	x	0.76	x	0.7	=	10.53	(81)
Northwest 0.9x	0.77	x	1.27	x	41.38	×	0.76	x	0.7	=	19.37	(81)
Northwest 0.9x	0.77	x	0.69	x	67.96	×	0.76	x	0.7	=	17.29	(81)
Northwest 0.9x	0.77	x	1.27	x	67.96	×	0.76	x	0.7	=	31.82	(81)
Northwest 0.9x	0.77	x	0.69	x	91.35	×	0.76	x	0.7	=	23.24	(81)
Northwest 0.9x	0.77	x	1.27	x	91.35	×	0.76	x	0.7	=	42.77	(81)
Northwest 0.9x	0.77	x	0.69	x	97.38	x	0.76	x	0.7	=	24.77	(81)
Northwest 0.9x	0.77	x	1.27	x	97.38	x	0.76	x	0.7	=	45.6	(81)
Northwest 0.9x	0.77	x	0.69	x	91.1	×	0.76	x	0.7	=	23.17	(81)
Northwest 0.9x	0.77	x	1.27	x	91.1	x	0.76	x	0.7	=	42.66	(81)
Northwest 0.9x	0.77	x	0.69	x	72.63	x	0.76	x	0.7	=	18.48	(81)
Northwest 0.9x	0.77	x	1.27	x	72.63	x	0.76	x	0.7	=	34.01	(81)
Northwest 0.9x	0.77	×	0.69	×	50.42	×	0.76	x	0.7	=	12.83	(81)
Northwest 0.9x	0.77	x	1.27	x	50.42	×	0.76	x	0.7	=	23.61	(81)
Northwest 0.9x	0.77	x	0.69	x	28.07	×	0.76	x	0.7	=	7.14	(81)
Northwest 0.9x	0.77	×	1.27	×	28.07	×	0.76	x	0.7	=	13.14	(81)
Northwest 0.9x	0.77	×	0.69	×	14.2	×	0.76	x	0.7	=	3.61	(81)
Northwest 0.9x	0.77	×	1.27	×	14.2	X	0.76	x	0.7	=	6.65	(81)
Northwest 0.9x	0.77	X	0.69	x	9.21	×	0.76	x	0.7	=	2.34	(81)
Northwest 0.9x	0.77	×	1.27	X	9.21	X	0.76	x	0.7	=	4.31	(81)
Rooflights 0.9x	1	X	12.74	x	20.24	X	0.76	x	0.7	=	123.44	(82)
Rooflights 0.9x	1	X	12.74	X	40.55	X	0.76	X	0.7	=	247.33	(82)
Rooflights 0.9x	1	X	12.74	X	74.78	X	0.76	X	0.7	=	456.16	(82)
Rooflights 0.9x	1	×	12.74	×	130.19	×	0.76	x	0.7	=	794.13	(82)
Rooflights 0.9x	1	×	12.74	×	183.82	×	0.76	x	0.7	=	1121.29	(82)
Rooflights 0.9x	1	×	12.74	×	200.21	×	0.76	x	0.7	=	1221.24	(82)
Rooflights 0.9x	1	×	12.74	×	185.57	×	0.76	x	0.7	=	1131.99	(82)
Rooflights 0.9x	1	×	12.74	x	142.19	X	0.76	x	0.7	=	867.36	(82)





Rooflights 0.9x 1	⊐ × Г	12.74	×	93.09] × [0.76	⊐ × Г	0.7		567.83	(82)
Rooflights 0.9x 1		12.74	x [49.71		0.76	╡╷┝	0.7		303.23	(82)
Rooflights 0.9x 1		12.74	×	25.27	x [0.76	╡╷┝	0.7		154.14	(82)
Rooflights 0.9x 1		12.74	x	16.69] x [0.76		0.7		101.83	(82)
		12.14		10.00		0.70		0.7		101.00	
Solar gains in watts, calc	ulated fo	or each mont	h		(83)m = 5	um(74)m .	(82)m				
	i	756.84 2267.43	1	2 2245.34	1839.3	1369.2	858.54	491.14	338.48		(83)
Total gains – internal and	l solar (8	 84)m = (73)m	+ (83)r	n, watts	<u> </u>		ļ				
(84)m= 1137.77 1469.18 1	875.1 2	2414.54 2878.6	5 2958.6	67 2791.54	2395.82	1951.9	1485.72	1167.82	1053.3		(84)
7. Mean internal temper	ature (h	neating seaso	n)								
Temperature during hea	ting per	riods in the liv	ing are	a from Tal	ole 9, Th	1 (°C)				21	(85)
Utilisation factor for gair	s for livi	ring area, h1,r	n (see	Table 9a)	_	_					
Jan Feb	Mar	Apr May	Jur	Jul	Aug	Sep	Oct	Nov	Dec		
(86)m= 0.99 0.97	0.92	0.75 0.53	0.36	0.26	0.32	0.57	0.89	0.98	0.99		(86)
Mean internal temperatu	ure in liv	ving area T1 (follow s	teps 3 to 7	7 in Tabl	e 9c)	-	-			
	-	20.85 20.97	21	21	21	20.97	20.71	20.2	19.81		(87)
Temperature during hea		riode in rest o	f dwalli	a from T		ן אס (ייר)					
	<u> </u>	19.91 19.91	19.91	<u> </u>	19.91	19.91	19.91	19.91	19.91		(88)
Utilisation factor for gair (89)m= 0.99 0.97	0.89	0.7 0.47	n2,m (9a) 0.24	0.49	0.85	0.97	0.99		(89)
								0.97	0.99		(00)
Mean internal temperate		I	T T	<u>`</u> r	r –	1	r í	1		I	(22)
(90)m= 18.42 18.81	9.33	19.76 19.89	19.91	19.91	19.91	19.89	19.61	18.91	18.34		(90)
						I		ng area ÷ (4	+) =	0.47	(91)
Mean internal temperate	ure (for t	the whole dw	elling) =	fLA × T1	+ (1 – fl	A) × T2	i		i		
(92)m= 19.09 19.43	9.88	20.27 20.39	20.42	20.42	20.42	20.4	20.13	19.51	19.02		(92)
Apply adjustment to the			1	Ĩ	1	1		r –		I	(22)
	I	20.27 20.39	20.42	20.42	20.42	20.4	20.13	19.51	19.02		(93)
8. Space heating require					T-11-0		· . /	70)		1	
Set Ti to the mean inter the utilisation factor for			ned at	step 11 of	I able 9	b, so tha	it II,m=(76)m an	d re-calc	culate	
Jan Feb	Mar	Apr May	Jur	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation factor for gair		<u>, , , , , , , , , , , , , , , , , , , </u>			,	<u> </u>	•••		200		
		0.72 0.5	0.33	0.23	0.28	0.53	0.86	0.97	0.99		(94)
Useful gains, hmGm , W	/ = (94)r	m x (84)m	•	!							
(95)m= 1123.11 1415.29 10	675.29 1	732.25 1427.3	5 966.6	9 636.2	668.42	1026.04	1271.34	1134.72	1043.41		(95)
Monthly average extern	al tempe	erature from	able 8		-	_		-			
(96)m= 4.3 4.9	6.5	8.9 11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat loss rate for mean					1	– (96)m	Ē			1	
		903.89 1454.8			669.44	1051.31		2080.62	2488.29		(97)
Space heating requirem		I	1	-	<u> </u>	i i	í - · ·	r –		I	
(98)m= 1018.95 692.79 4	28.29 1	123.58 20.47	0	0	0	0	240.14	681.05	1074.98		
					Tota	al per year	(kWh/yea	r) = Sum(9	8)15,912 =	4280.26	(98)
Space heating requirem	ent in k	Wh/m²/year								31.07	(99)



9a. En	ergy rec	quiremer	nts – Ind	ividual h	eating sy	/stems i	ncluding	micro-C	CHP)					
•	e heatii	-	t frage -		10.00-1-		0.01						2	
				econdary		mentary		(202) = 1 -	_ (201) _				0	(201)
	•			nain syst						(202)1			1	(202)
			-	main sys				(204) = (20	02) x [1 – 1	(203)] =			1	(204)
	•			ting syste			. 0/						90.4	(206)
Efficie			1	ementar						-			0	(208)
Spage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	r
Space	1018.95	ř. – –	428.29	alculate	20.47	0	0	0	0	240.14	681.05	1074.98		
(211)m				100 ÷ (20			-							(211)
(211)	1127.16	í È	473.78	136.71	22.64	0	0	0	0	265.64	753.37	1189.14		(2)
		Į	Į	ļ			1	Tota	l (kWh/yea	ar) =Sum(2	2 11) _{15,1012}	 ≓	4734.8	(211)
Space	e heatin	g fuel (s	econdar	y), kWh/	month									J
)m x (20	01)]	00 ÷ (20)8)									I	
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		1
								lota	l (kWh/yea	ar) =Sum(2	215) _{15,1012}	F	0	(215)
	heating		ter (calc	ulated al										
Output	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		
Efficier	ncy of w	ater hea	ater										80.3	(216)
(217)m=	88.43	87.98	86.88	84.1	81.24	80.3	80.3	80.3	80.3	85.66	87.89	88.55		(217)
		heating,					-			_	_			
. ,	1 = (64) 248.33	m x 100) ÷ (217 233.82)m 216.41	217.67	193.96	185.83	207.15	208.64	220.33	227.21	241.98		
(,									I = Sum(2'				2621.27	(219)
Annua	l totals	i								k\	Wh/year	•	kWh/year]``´
Space	heating	fuel use	ed, main	system	1						•		4734.8]
Water	heating	fuel use	d										2621.27]
Electric	city for p	oumps, f	ans and	electric	keep-ho	t								-
centra	al heatir	ng pump	:									30		(230c)
		an-assis										45		(230e)
				kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
			ubovc,	KWIII/you	•				. (,	(5/				(232)
	city for I				- 1								483.11	(232)
10a. I	-uel cos	sts - Indiv	vidual he	eating sy	stems:									
						Fu kW	el /h/year			Fuel P (Table			Fuel Cost £/year	
Space	heating	- main s	system '	1		(21	1) x			3.4	8	x 0.01 =	164.77	(240)
Space	heating	- main s	system 2	2		(213	3) x			0		x 0.01 =	0	(241)
Space	heating	- secon	dary			(21	5) x			13.	19	x 0.01 =	0	(242)
Water	heating	cost (ot	her fuel)			(219	9)			3.4	8	x 0.01 =	91.22	(247)



Pumps, fans and electric keep-hot	(231)	13.19 × 0.01 =	9.89 (249)
(if off-peak tariff, list each of (230a) to (23 Energy for lighting	30g) separately as applicable and a (232)	pply fuel price according to $13.19 \times 0.01 =$	Table 12a 63.72 (250)
Additional standing charges (Table 12)			120 (251)
	one of (233) to (235) x)	13.19 × 0.01 =	0 (252)
Appendix Q items: repeat lines (253) and	(254) as needed	10.10	
	(245)(247) + (250)(254) =		449.61 (255)
11a. SAP rating - individual heating sys	tems		
Energy cost deflator (Table 12)			0.42 (256)
Energy cost factor (ECF)	[(255) x (256)] ÷ [(4) + 45.0] =		1.03 (257)
SAP rating (Section 12)			85.59 (258)
12a. CO2 emissions – Individual heating	g systems including micro-CHP		
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	1022.72 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	566.19 (264)
Space and water heating	(261) + (262) + (263) + (264)	=	1588.91 (265)
Electricity for pumps, fans and electric ke	ep-hot (231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	250.74 (268)
Energy saving/generation technologies			
Total CO2, kg/year		um of (265)(271) =	1878.57 (272)
CO2 emissions per m ²	(;	272) ÷ (4) =	13.64 (273)
EI rating (section 14)			86 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22 =	5776.45 (261)
Space heating (secondary)	(215) x	3.07 =	0 (263)
Energy for water heating	(219) x	1.22 =	3197.95 (264)
Space and water heating	(261) + (262) + (263) + (264)	=	8974.41 (265)
Electricity for pumps, fans and electric ke	ep-hot (231) x	3.07 =	230.25 (267)
Electricity for lighting	(232) x	0 =	1483.16 (268)
Energy saving/generation technologies 'Total Primary Energy	s	um of (265)(271) =	10687.82 (272)
Primary energy kWh/m²/year	(:	272) ÷ (4) =	77.58 (273)



User Details:	
Assessor Name: Peter Mitchell Stroma Number: STRO007945	
Software Name: Stroma FSAP 2012 Software Version: Version: 1.0.3.1	5
Property Address: Unit 1 (GF&FF END) LEAN	
Address : New Dwelling at:, Gordon House, 6 Lissenden Gardens, LONDON, NW5 1LX	
1. Overall dwelling dimensions:	
Area(m ²) Av. Height(m) Volume(m³)
Ground floor 73.62 (1a) x 2.4 (2a) = 176.69	(3a)
First floor 64.14 (1b) x 3.32 (2b) = 212.94	(3b)
Total floor area TFA = $(1a)+(1b)+(1c)+(1d)+(1e)+(1n)$ 137.76 (4)	
Dwelling volume $(3a)+(3c)+(3d)+(3e)+(3n) = 389.63$	(5)
2. Ventilation rate:	
main secondary other total m ³ per h heating heating	our
Number of chimneys $0 + 0 + 0 = 0 \times 40 = 0$	(6a)
Number of open flues 0 + 0 = 0 $\times 20$ = 0	(6b)
Number of intermittent fans2× 10 =20	(7a)
Number of passive vents 0 × 10 = 0	(7b)
Number of flueless gas fires 0 × 40 = 0	(7c)
Air changes per	hour
Infiltration due to chimneys, flues and fans = $(6a)+(6b)+(7a)+(7c)=$ 20 \div (5) = 0.05	(8)
If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)	
Number of storeys in the dwelling (ns)0Additional infiltration[(9)-1]x0.1 =0	(9)
	(10)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction 0 if both types of wall are present, use the value corresponding to the greater wall area (after	(11)
deducting areas of openings); if equal user 0.35	
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0	(12)
If no draught lobby, enter 0.05, else enter 0	(13)
Percentage of windows and doors draught stripped 0	(14)
Window infiltration $0.25 - [0.2 \times (14) \div 100] = 0$	(15)
Infiltration rate $(8) + (10) + (11) + (12) + (13) + (15) = 0$	(16)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area	(17)
If based on air permeability value, then $(18) = [(17) \div 20]+(8)$, otherwise $(18) = (16)$ 0.25	(18)
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered 3	
Number of sides sheltered3Shelter factor $(20) = 1 - [0.075 \times (19)] =$ 0.78	(19) (20)
	(20)
Infiltration rate incorporating shelter factor $(21) = (18) \times (20) = 0.19$ Infiltration rate modified for monthly wind speed	(21)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
Monthly average wind speed from Table 7	



Wind F	actor (2	2a)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 sł	nelter an	d wind s	peed) =	(21a) x	(22a)m					
	0.25	0.24	0.24	0.21	0.21	0.19	0.19	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 Fmv (e	equation (N	N5)), othe	rwise (23h) - (23a)			0	(23a)
			• • •		, ,	, ,		n Table 4h		() = (20u)			0	(23b)
			-	-	-			HR) (24a		2h)m + ('	23h) v [[,]	1 _ (23c)	0 	(23c)
(24a)m=		0			0									(24a)
		d mech	I anical ve	L entilation	L without	L heat rec	L coverv (N	I MV) (24b	$1_{0}m = (2)$	L 2b)m + (;	L 23b)			
(24b)m=		0		0	0	0	0	0	0	0	0	0		(24b)
			I tract ver	L ntilation o	L or positiv	L /e input v	L ventilatio	n from c	L outside					
,					•	•		c) = (22b		.5 × (23b)			
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24c)
,						•		on from I				-		
	r í í		r , ,	· · · ·	, 	· · · ·	<u> </u>	0.5 + [(2	<u>, </u>	0.5]	r		I	
(24d)m=		0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53		(24d)
	i			· · · · · · · · · · · · · · · · · · ·	, <u>,</u>	<u> </u>	<u>, ,</u>	d) in boy	r <u>í</u>	1	1	1	I	()
(25)m=	0.53	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53		(25)
3. He	at losses	s and he	eat loss _l	paramet	er:									
3. He ELEN		s and he Gros area	SS	parameto Openin rr	gs	Net Ar A ,r		U-valı W/m2		A X U (W/I	<)	k-value kJ/m²-I		A X k kJ/K
ELEN		Gros area	SS	Openin	gs		n²		?K		<)			
ELEN Windo	IENT	Gros area	SS	Openin	gs	A ,r	m ²	W/m2	2K 0.04] =	(W/I	<) 			kJ/K
ELEN Windo Windo	/IENT ws Type	Gros area 1 2	SS	Openin	gs	A ,r 5.31	n ² x ^{1,}	W/m2 /[1/(1.4)+	K 0.04] = 0.04] =	(W/ł 7.04	<) 			kJ/K (27)
ELEN Windo Windo Windo	IENT ws Type ws Type	Gros area 1 2 3	SS	Openin	gs	A ,r 5.31 8.12	m ² x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+	2K 0.04] = 0.04] = 0.04] =	(W/ł 7.04 10.77	<) 			kJ/K (27) (27)
ELEN Windo Windo Windo Windo	IENT ws Type ws Type ws Type	Gros area 1 2 3 4	SS	Openin	gs	A ,r 5.31 8.12 2.53	n ² x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	2K 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35	\diamond			kJ/K (27) (27) (27)
ELEN Windo Windo Windo Windo	IENT ws Type ws Type ws Type ws Type	Gros area 1 2 3 4 5	SS	Openin	gs	A ,r 5.31 8.12 2.53 2.53	n ² x ¹ . x ¹ . x ¹ . x ¹ . x ¹ . x ¹ .	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35 3.35	<>			kJ/K (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo	IENT ws Type ws Type ws Type ws Type ws Type	Gros area 1 2 3 4 5 6	SS	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35 3.35 3.35	\diamond			kJ/K (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo	IENT ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 1 2 3 4 5 6 7	SS	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53 2.53	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35 3.35 3.35 3.35	\diamond			kJ/K (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 1 2 3 4 5 6 7 8	SS	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91	\diamond			kJ/K (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo	MENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 1 2 3 4 5 6 7 8	SS	Openin	gs	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo Windo	MENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 1 2 3 4 5 6 7 8 9	ss (m²)	Openin	gs 1 ²	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo Windo Rooflig Walls	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ghts	Gros area 1 2 3 4 5 6 7 8 9	.2	Openin m	gs 1 ²	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo Windo Rooflig	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ghts	Gros area 1 2 3 4 5 6 7 8 9 9	.2 8	Openin m 28.9	gs 1 ² 3	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92 1.33				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo Windo Rooflig Walls Roof	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ghts Type1 Type2	Gros area 1 2 3 4 5 6 7 8 9 9 147 9.4 71.6	.2 87	Openin m	gs 1 ² 3	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48 58.93	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} 0.04] = \\$	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo Windo Rooflig Walls Roof	MENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ghts Type1 Type2 area of e	Gros area 1 2 3 4 5 6 7 8 9 9 147 9.4 71.6	.2 87	Openin m 28.9	gs 1 ² 3	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48 58.93 228.3	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.$	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92 1.33 8.25				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEN Windo Windo Windo Windo Windo Windo Windo Rooflig Walls Roof	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ghts Type1 Type2 area of e wall	Gros area 1 2 3 4 5 6 7 8 9 9 147 9.4 71.6	.2 87	Openin m 28.9	gs 1 ² 3	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 0.69 1.27 3.42 12.74 118.2 9.48 58.93	n ² x1. x1. x1. x1. x1. x1. x1. x1. x1. x1.	W/m2 /[1/(1.4)+ /[1/(.4)+ /[1/(1.4)+	$\begin{array}{c} 0.04] = \\$	(W/H 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53 17.836 18.92 1.33				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)

ıg /[(** include the areas on both sides of internal walls and partitions

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

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



Heat c	apacity	Cm = S((Axk)						((28)	(30) + (32	2) + (32a).	(32e) =	0	(34)
Therm	al mass	parame	ter (TMF	^o = Cm ÷	÷ TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	(35)
	•		ere the de tailed calc		construct	ion are noi	t known pr	ecisely the	e indicative	e values of	TMP in Ta	able 1f		
Therm	al bridge	es : S (L	x Y) cal	culated u	using Ap	pendix I	<						16.5	(36)
if details	s of therma	l bridging	are not kn	own (36) =	= 0.15 x (3	1)								
Total f	abric he	at loss							(33) +	(36) =			100.24	(37)
Ventila	ation hea	t loss ca	alculated	monthl	у				(38)m	= 0.33 × (25)m x (5)			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m=	68.25	68.1	67.95	67.24	67.11	66.49	66.49	66.38	66.73	67.11	67.38	67.66		(38)
Heat t	ransfer o	oefficier	nt, W/K						(39)m	= (37) + (38)m		-	
(39)m=	168.49	168.34	168.19	167.48	167.35	166.73	166.73	166.62	166.97	167.35	167.62	167.9		_
Heat lo	oss para	meter (H	HLP), W/	/m²K						Average = = (39)m ÷	Sum(39) _{1.} • (4)	12 /12=	167.48	(39)
(40)m=	1.22	1.22	1.22	1.22	1.21	1.21	1.21	1.21	1.21	1.21	1.22	1.22		
Numb	er of day	rs in mor	nth (Tab	le 1a)					,	Average =	Sum(40)1.	12 /12=	1.22	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4 \N/:	ater heat	ing ener	rgy requi	irement [.]								kWh/y	ear:	
		ing one	gyroqu										oan	
if TF	ned occu A > 13.9 A £ 13.9	9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9))2)] + 0.0)013 x (⁻	TFA -13		91]	(42)
			ater usad	ne in litre	es per da	av Vd av	erage =	(25 x N)	+ 36		103	3.38	1	(43)
			•		•		designed t	` '		se target o		0.00]	(10)
not mor	e that 125	litres per p	person pei	r day (all w	vater use, l	hot and co	ld)							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wat	er usage i	n litres per	day for ea	ach month	Vd,m = fa	ctor from T	Table 1c x	(43)						
(44)m=	113.71	109.58	105.44	101.31	97.17	93.04	93.04	97.17	101.31	105.44	109.58	113.71		
	.									Total = Su	m(44) ₁₁₂ =		1240.52	(44)
Energy	content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	m x nm x D	0Tm / 3600) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		
(45)m=	168.63	147.49	152.2	132.69	127.32	109.86	101.81	116.82	118.22	137.77	150.39	163.31		
									-	Total = Su	m(45) ₁₁₂ =		1626.52	(45)
lf instan	taneous w	ater heatii	ng at point	of use (no	o hot water	r storage),	enter 0 in	boxes (46,) to (61)					
(46)m=	25.3	22.12	22.83	19.9	19.1	16.48	15.27	17.52	17.73	20.67	22.56	24.5		(46)
	storage										-			
Storag	je volum	e (litres)	includir	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0	J	(47)
	•	-			-		litres in	. ,						
			hot wate	er (this in	ncludes i	nstantar	neous co	mbi boil	ers) ente	ər '0' in (47)			
	storage						(day)						1	(10)
					UT IS KNO	wn (kWł	i∕uay):				<u> </u>	0]	(48)
			m Table								(0	J	(49)
Energ	/ loot fro	muuntar						(48) x (49)					1	



lf com Volum	ater stora munity h e factor erature fa	0		(51) (52) (53)										
-				, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(54)
		(54) in (5	-	, .,				. , . ,		,		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)
	er contains	s dedicate	l d solar sto	i rage, (57)i	I m = (56)m	x [(50) – (L H11)] ÷ (50	0), else (5	7)m = (56)	n where (H11) is fro	m Append	ix H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
												0		(58)
Primar	y circuit	loss cal	culated		month (. ,	• •		r thermo				(00)
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss ca	lculated	for each	month ((61)m =	(60) ÷ 36	65 × (41))m						
(61)m=	50.96	46.03	50.96	49.32	49.52	45.88	47.41	49.52	49.32	50.96	49.32	50.96		(61)
Total h	eat requ	uired for	water h	eating ca	alculated	for eacl	h month	(62)m =	0.85 × ((45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m=	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		(62)
Solar DI	-W input o	calculated	using App	endix G or	r Appendix	H (negativ	ve quantity	/) (enter '0	if no sola	r contribut	ion to wate	er heating)		
(add a	dditiona	l lines if	FGHRS	and/or \	NWHRS	applies	, see Ap	pendix C	G)					
(63)m=	0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output	from w	ater hea	ter											
(64)m=	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		
								Outp	out from wa	ater heate	r (annual)₁	12	2216.65	(64)
Heat g	ains froi	m water	heating,	kWh/m	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 >	۲ ((46)m	+ (57)m	+ (59)m]	
(65)m=	68.81	60.55	63.34	56.45	54.71	48	45.7	51.22	51.64	58.55	62.33	67.04		(65)
inclu	ıde (57)ı	m in calo	culation	of (65)m	only if c	ylinder is	s in the c	dwelling	or hot w	ater is fr	om com	munity h	eating	
5. Int	ernal ga	ains (see	Table 5	5 and 5a):									
Metab	olic gain	s (Table	e 5). Wat	ts										
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m=	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63		(66)
Lightin	g gains	(calcula	ted in Ap	opendix	L, equat	ion L9 oi	r L9a), a	lso see	Table 5					
(67)m=	27.36	24.3	19.76	14.96	11.18	9.44	10.2	13.26	17.8	22.6	26.37	28.12		(67)
Applia	nces gai	ins (calc	ulated ir	Append	dix L, eq	uation L	13 or L1	3a), alsc	see Ta	ble 5				
(68)m=	306.85	310.03	302.01	284.93	263.37	243.1	229.56	226.38	234.4	251.48	273.05	293.31		(68)
Cookir	ng gains	(calcula	ted in A	ppendix	L, equat	ion L15	or L15a)), also se	e Table	5				
(69)m=	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56		(69)
Pumps	and far	ns gains	(Table {	5a)										
(70)m=	3	3	3	3	3	3	3	3	3	3	3	3		(70)
Losses	s e.a. ev	aporatio	n (nega	tive valu	ı es) (Tab	le 5)				1				
	-116.51		-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51		(71)
Water	heating	gains (T	able 5)	I	<u>.</u>					<u>.</u>				
		5 - 1.	/											
(72)m=	92.49	90.1	85.14	78.4	73.54	66.67	61.43	68.85	71.72	78.7	86.57	90.11		(72)





r39ma 496.88 491.2 476.6 417.78 88.9 70.88 370.8 393.61 42.24 445.68 41.23 (7) Star gaines calculate use use use use use use use use use us	Total internal	gains =				(6	i6)m + (67)m	n + (68	s)m + (69)m	+ (70)m	+ (71)m + (72)m		
Area m² <th< td=""><td>(73)m= 496.38</td><td>494.12</td><td>476.6</td><td>447.98</td><td>417.78</td><td>388.9</td><td>370.88</td><td>378.</td><td>.18 393.6</td><td>61 422.</td><td>47 455.68</td><td>481.23</td><td></td><td>(73)</td></th<>	(73)m= 496.38	494.12	476.6	447.98	417.78	388.9	370.88	378.	.18 393.6	61 422.	47 455.68	481.23		(73)
Orientation: Acess Factor Table 60 Area m ² Flux Table 6a g_ fable 6b FF Table 6c Gains (W) Northeast 0.sv 0.077 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.sv 0.077 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.sv 0.077 × 2.53 × 11.28 × 0.76 × 0.77 = 21.42 (75) Northeast 0.sv 0.077 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.sv 0.077 × 2.53 × 41.38 × 0.76 × 0.77 = 21.42 (75) Northeast 0.sv 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) Northeast 0.sv 0.77 × 2.53	6. Solar gains	S:												
Table 6d m² Table 6a Table 6b Table 6b Table 6c (W) Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 761 Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 761 Northeast 0.9 0.77 x 2.53 x 12.84 0.76 x 0.77 = 21.42 761 Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 761 Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 761 Northeast 0.9 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.8 761 Northeast 0.9 0.77	-		-	r flux from	Table 6a			itions t	o convert to	o the appl		tion.		
Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) Northeast 0.9x 0.77 × 2.53 <			actor							sh				
Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.7 = 10.52 (75) Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.7 = 10.52 (75) Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 21.93 x 11.38 x 0.76 x 0.7 = 38.6 (75) Northeast 0.9 0.77 x 2.53 x 67.96 x 0.77 = <td>-</td> <td>able ou</td> <td></td> <td></td> <td></td> <td>·</td> <td>able ba</td> <td></td> <td>i able t</td> <td></td> <td></td> <td></td> <td>(• • •)</td> <td></td>	-	able ou				·	able ba		i able t				(• • •)	
Northeast 0.9k 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.9k 0.77 x 2.53 x 11.28 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9k 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.9k 0.77 x 2.53 x 22.97 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9k 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 23.66 (75) Northeast 0.9k 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 33.66 (75) Northeast 0.9k 0.77 x 2.53 x 67.96 x 0.77 = 63.39	L	0.77	x	2.5	53	×	11.28	X	0.76	×	0.7	=	10.52	(75)
Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 0.152 (75) Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9 0.77 x 2.53 x 67.96 x 0.77 = 63.39 (75) Northeast 0.9 0.77 x 2.53 x 67.96 x <td>L</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>11.28</td> <td>x</td> <td>0.76</td> <td>×</td> <td>0.7</td> <td>=</td> <td>10.52</td> <td>(75)</td>	L	0.77	x	2.5	53	x	11.28	x	0.76	×	0.7	=	10.52	(75)
Northeast 0.9 0.77 x 2.253 x 2.2297 x 0.76 x 0.77 = 2.1.42 (75) Northeast 0.9 0.77 x 2.53 x 2.2.97 x 0.76 x 0.77 = 2.1.42 (75) Northeast 0.9 0.77 x 2.53 x 2.2.97 x 0.76 x 0.77 = 2.1.42 (75) Northeast 0.9 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9 0.77 x 2.53 x 67.96 x 0.76 x 0.77	L	0.77	x	2.5	53	×	11.28	X	0.76	×	0.7	=	10.52	(75)
Northeast 0,9 0.77 x 2.53 x 2.297 x 0.76 x 0.77 = 2.1.42 (75) Northeast 0,9 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 2.1.42 (75) Northeast 0,9 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 2.1.42 (75) Northeast 0,9 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 38.6 (75) Northeast 0,9 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 38.6 (75) Northeast 0,9 0.77 x 2.53 x 67.96 x 0.76 x 0.7 = 63.39 (75) Northeast 0,9 0.77 x 2.53 x 67.96 x 0.76 x 0.7 =<	L	0.77	x	2.5	53	x	11.28	x	0.76	x	0.7	=	10.52	(75)
Northeast 0.8x 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.9x 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.7 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 <	L	0.77	x	2.5	53	x	22.97	x	0.76	x	0.7	=	21.42	(75)
Northeast 0.sx 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.sx 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sx 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sx 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sx 0.77 x 2.53 x 67.96 x 0.76 x 0.7 = 63.39 (75) Northeast 0.sx 0.77 x 2.53 x 67.96 x 0.76 x 0.7 = 63.39 (75) Northeast 0.sx 0.77 x 2.53 x 91.35 x 0.76 x 0.7 <t< td=""><td>L</td><td>0.77</td><td>x</td><td>2.5</td><td>53</td><td>x</td><td>22.97</td><td>x</td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>21.42</td><td>(75)</td></t<>	L	0.77	x	2.5	53	x	22.97	x	0.76	x	0.7	=	21.42	(75)
Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 <	L	0.77	x	2.5	53	x	22.97	x	0.76	x	0.7	=	21.42	(75)
Northeast 0.94 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.94 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.94 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.94 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.94 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.94 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.94 0.77 x 2.53 <	L	0.77	x	2.5	53	x	22.97	x	0.76	X	0.7	=	21.42	(75)
Northeast 0.94 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.94 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.94 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.94 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.94 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.94 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.94 0.77 x 2.53	Northeast 0.9x	0.77	x	2.5	53	x	41.38	x	0.76	X	0.7	=	38.6	(75)
Northeast 0.9 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) Northeast 0.9 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9 0.77 × 2.53 91.35 </td <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>41.38</td> <td>x</td> <td>0.76</td> <td>X</td> <td>0.7</td> <td>=</td> <td>38.6</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	41.38	x	0.76	X	0.7	=	38.6	(75)
Northeast 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97	Northeast 0.9x	0.77	x	2.5	53	x	41.38	x	0.76	х	0.7	=	38.6	(75)
Northeast0.9x0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast0.9x0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast0.9x0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast0.9x0.77x2.53x91.35x0.76x0.7=63.39(75)Northeast0.9x0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast0.9x0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast0.9x0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast0.9x0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast0.9x0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast0.9x0.77x2.53x97.38x0.76x0.7=90.84(75)Northeast0.9x0.77x2.53x97.38x0.76x0.7=90.84(75)Northeast0.9x0	Northeast 0.9x	0.77	x	2.5	53	x	41.38	x	0.76	x	0.7	=	38.6	(75)
Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 90.84 (75) Northeast 0.9x 0.77 × 2.53 <td< td=""><td>Northeast 0.9x</td><td>0.77</td><td>x</td><td>2.5</td><td>53</td><td>x</td><td>67.96</td><td>x</td><td>0.76</td><td>х</td><td>0.7</td><td>=</td><td>63.39</td><td>(75)</td></td<>	Northeast 0.9x	0.77	x	2.5	53	x	67.96	x	0.76	х	0.7	=	63.39	(75)
Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 90.84 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 90.84 (75) Northeast 0.9x 0.77 × 2.53	Northeast 0.9x	0.77	x	2.5	53	x	67.96	x	0.76	x	0.7	=	63.39	(75)
Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.77 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.77 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.77 = 90.84 (75) Northeast 0.9x 0.77 x 2.53	Northeast 0.9x	0.77	x	2.5	53	x	67.96	x	0.76	x	0.7	=	63.39	(75)
Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.7 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 90.84 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 90.84 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77 = 84.97 (75) Northeast 0.9x 0.77 × 2.53 ×	Northeast 0.9x	0.77	x	2.5	53	x	67.96	x	0.76	x	0.7	=	63.39	(75)
Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 91.1 x 0.76 x 0.7 = 84.97 (75) Northeast 0.9x 0.77 x 2.53 x	Northeast 0.9x	0.77	x	2.5	53	x	91.35	x	0.76	x	0.7	=	85.2	(75)
Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 85.2 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 97.38 x 0.76 x 0.7 = 90.84 (75) Northeast 0.9x 0.77 x 2.53 x 91.1 x 0.76 x 0.7 = 84.97 (75) Northeast 0.9x 0.77 x 2.53 x	Northeast 0.9x	0.77	x	2.5	53	x	91.35	x	0.76	x	0.7	=	85.2	(75)
Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 <	Northeast 0.9x	0.77	x	2.5	53	x	91.35	x	0.76	x	0.7	=	85.2	(75)
Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 </td <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>91.35</td> <td>x</td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>85.2</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	91.35	x	0.76	x	0.7	=	85.2	(75)
Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 </td <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>97.38</td> <td>x</td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>90.84</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	97.38	x	0.76	x	0.7	=	90.84	(75)
Northeast $0.9x$ 0.77 x 2.53 x 97.38 x 0.76 x 0.7 $=$ 90.84 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>97.38</td> <td>x</td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>90.84</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	97.38	x	0.76	x	0.7	=	90.84	(75)
Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>97.38</td> <td>x</td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>90.84</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	97.38	x	0.76	x	0.7	=	90.84	(75)
Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 $=$ 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 $=$ 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	97.38	x	0.76	x	0.7	=	90.84	(75)
Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 = 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 = 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	91.1	x	0.76	x	0.7	=	84.97	(75)
Northeast $0.9x$ 0.77 x 2.53 x 91.1 x 0.76 x 0.7 = 84.97 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	91.1	x	0.76	x	0.7	=	84.97	(75)
Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	91.1	x	0.76	x	0.7	=	84.97	(75)
Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 $=$ 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 $=$ 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	91.1	x	0.76	x	0.7	=	84.97	(75)
Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	72.63	x	0.76	×	0.7	=	67.74	(75)
Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 47.03 (75)	Northeast 0.9x	0.77	x	2.5	53	x	72.63	x	0.76	×	0.7	=	67.74	(75)
Northeast $0.9x$ 0.77 x 2.53 x 72.63 x 0.76 x 0.7 = 67.74 (75) Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 67.74 (75)	Northeast 0.9x		x	2.5	53	× 🕅	72.63	x	0.76	×	0.7	=	67.74	(75)
Northeast $0.9x$ 0.77 x 2.53 x 50.42 x 0.76 x 0.7 = 47.03 (75)	Northeast 0.9x		x	2.5	53	x	72.63	x	0.76	×		=	67.74	(75)
	Northeast 0.9x		x			× 🗌		x		×		=		
0.77 0.77 0.77 1.00	Northeast 0.9x	0.77	x			x	50.42	x	0.76	x		=	47.03	(75)



Northeast 0.9x	0.77	×	2.53	×	50.42	×	0.76	×	0.7	=	47.03	(75)
Northeast 0.9x	0.77	x	2.53	×	50.42	x	0.76	x	0.7	=	47.03	(75)
Northeast 0.9x	0.77	x	2.53	×	28.07	×	0.76	x	0.7	i =	26.18	(75)
Northeast 0.9x	0.77	x	2.53	×	28.07	×	0.76	x	0.7	=	26.18	(75)
Northeast 0.9x	0.77	x	2.53	×	28.07	×	0.76	x	0.7	=	26.18	(75)
Northeast 0.9x	0.77	x	2.53	x	28.07	x	0.76	x	0.7	=	26.18	(75)
Northeast 0.9x	0.77	x	2.53	×	14.2	×	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	×	14.2	×	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	14.2	×	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	×	14.2	x	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	×	9.21	x	0.76	x	0.7	=	8.59	(75)
Northeast 0.9x	0.77	x	2.53	x	9.21	×	0.76	x	0.7	=	8.59	(75)
Northeast 0.9x	0.77	x	2.53	×	9.21	×	0.76	x	0.7	=	8.59	(75)
Northeast 0.9x	0.77	x	2.53	x	9.21	x	0.76	x	0.7	=	8.59	(75)
Southwest _{0.9x}	0.77	x	5.31	x	36.79]	0.76	x	0.7	=	72.03	(79)
Southwest _{0.9x}	0.77	x	8.12	×	36.79		0.76	x	0.7	=	110.15	(79)
Southwest _{0.9x}	0.77	x	3.42	x	36.79]	0.76	x	0.7	=	46.39	(79)
Southwest _{0.9x}	0.77	x	5.31	x	62.67]	0.76	x	0.7	=	122.69	(79)
Southwest _{0.9x}	0.77	x	8.12	x	62.67]	0.76	x	0.7	=	187.62	(79)
Southwest _{0.9x}	0.77	x	3.42	x	62.67]	0.76	x	0.7	=	79.02	(79)
Southwest _{0.9x}	0.77	x	5.31	×	85.75]	0.76	x	0.7	=	167.88	(79)
Southwest _{0.9x}	0.77	x	8.12	x	85.75]	0.76	x	0.7	=	256.71	(79)
Southwest _{0.9x}	0.77	x	3.42	x	85.75]	0.76	x	0.7	=	108.12	(79)
Southwest _{0.9x}	0.77	x	5.31	x	106.25		0.76	x	0.7	=	208.01	(79)
Southwest _{0.9x}	0.77	x	8.12	×	106.25		0.76	x	0.7	=	318.08	(79)
Southwest _{0.9x}	0.77	x	3.42	×	106.25		0.76	x	0.7	=	133.97	(79)
Southwest _{0.9x}	0.77	x	5.31	×	119.01		0.76	x	0.7	=	232.98	(79)
Southwest _{0.9x}	0.77	x	8.12	×	119.01	ļ	0.76	x	0.7	=	356.28	(79)
Southwest _{0.9x}	0.77	x	3.42	×	119.01	ļ	0.76	x	0.7	=	150.06	(79)
Southwest _{0.9x}	0.77	×	5.31	×	118.15		0.76	x	0.7	=	231.3	(79)
Southwest _{0.9x}	0.77	x	8.12	×	118.15]	0.76	X	0.7	=	353.7	(79)
Southwest _{0.9x}	0.77	X	3.42	×	118.15]	0.76	X	0.7	=	148.97	(79)
Southwest _{0.9x}	0.77	X	5.31	X	113.91]	0.76	X	0.7	=	223	(79)
Southwest _{0.9x}	0.77	X	8.12	X	113.91]	0.76	X	0.7	=	341	(79)
Southwest _{0.9x}	0.77	X	3.42	X	113.91]	0.76	X	0.7	=	143.62	(79)
Southwest _{0.9x}	0.77	X	5.31	X	104.39]	0.76	X	0.7	=	204.36	(79)
Southwesto.9x	0.77	×	8.12	X	104.39]	0.76	X	0.7	=	312.51	(79)
Southwesto.9x	0.77	×	3.42	X	104.39]	0.76	X	0.7	=	131.62	(79)
Southwesto av	0.77	×	5.31	X	92.85] 1	0.76	X	0.7	=	181.77	(79)
Southwest _{0.9x}	0.77	×	8.12	X	92.85] 1	0.76	X	0.7	=	277.97	(79)
Southwest().9x	0.77	×	3.42	×	92.85	J	0.76	X	0.7	=	117.07	(79)



Southwest) 9, 0.77 × 0.81 × 0.827 , 0.76 × 0.7 = 138.6 70 Southwest) 9, 0.77 × 0.81 × 0.827 , 0.76 × 0.7 = 0.734 (7) Southwest) 9, 0.77 × 0.81 × 0.4407 , 0.76 × 0.7 = 0.734 (7) Southwest) 9, 0.77 × 0.81 × 0.4407 , 0.76 × 0.7 = 0.422 (7) Southwest) 9, 0.77 × 0.81 × 0.4407 , 0.76 × 0.7 = 0.422 (7) Southwest) 9, 0.77 × 0.81 × 0.4407 , 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.81 × 0.4407 , 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.81 × 0.4407 , 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.81 × 0.140 , 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.81 × 0.140 , 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.81 × 0.140 , 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.82 × 0.1120 × 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.89 × 0.1120 × 0.76 × 0.7 = 0.164 (7) Southwest) 9, 0.77 × 0.68 × 0.120 × 0.76 × 0.7 = 0.27 (7) Northwest) 9, 0.77 × 0.68 × 0.120 × 0.76 × 0.7 = 0.27 (7) Northwest) 9, 0.77 × 0.68 × 0.120 × 0.76 × 0.7 = 0.24 (8) Northwest) 9, 0.77 × 0.68 × 0.120 × 0.76 × 0.7 = 0.164 (8) Northwest) 9, 0.77 × 0.88 × 0.4138 × 0.76 × 0.7 = 0.1033 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.1033 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.1033 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.123 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.123 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.788 × 0.76 × 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.807 × 0.7 = 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.807 × 0.7 = 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.807 × 0.7 = 0.7 = 0.234 (8) Northwest) 9, 0.77 × 0.88 × 0.807 × 0.7 = 0.7 = 0.234 (8) No													
Southwesti, ar. 0.77 x 3.42 x (69.27) 0.76 x 0.77 x 5.31 x 44.407 0.76 x 0.77 x 6.8.28 (79) Southwesti, ar. 0.77 x 8.12 x 44.407 0.76 x 0.77 x 6.8.28 (79) Southwesti, ar. 0.77 x 3.42 x 44.407 0.76 x 0.77 x 6.8.28 (79) Southwesti, ar. 0.77 x 5.31 x 31.49 0.76 x 0.77 x 6.8.27 (79) Southwesti, ar. 0.77 x 8.4.2 x 0.76 x 0.77 x 3.4.2 x 0.76 x 0.77 x 3.4.2 x 0.76 x 0.77 x 3.6.2 (79) x 0.76 x 0.77 x 0.6.6 x 0.76 x 0.77 x 0.6.6 x 0.76 x 0.77 x 0.5.6 (79) x 0.77	Southwest _{0.9x}	0.77	x	5.31	×	69.27		0.76	x	0.7	=	135.6	(79)
Southwesto.ox 0.77 × 5.31 × 44.07 0.76 × 0.77 = 88.28 (7) Southwesto.ox 0.77 × 5.31 × 44.07 0.76 × 0.7 = 5.57 (7) Southwesto.ox 0.77 × 5.31 × 11.40 0.76 × 0.7 = 5.57 (7) Southwesto.ox 0.77 × 5.31 × 11.40 0.76 × 0.7 = 5.57 (7) Southwesto.ox 0.77 × 5.42 × 31.49 0.76 × 0.7 = 5.42 (7) Northwesto.ox 0.77 × 6.69 × 112.8 × 0.76 × 0.7 = 5.84 (8) Northwesto.ox 0.77 × 1.27 × 12.37 × 0.76 × 0.7 = 1.0.5 (8) Northwesto.ox <t< td=""><td>Southwest_{0.9x}</td><td>0.77</td><td>x</td><td>8.12</td><td>×</td><td>69.27</td><td></td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>207.36</td><td>(79)</td></t<>	Southwest _{0.9x}	0.77	x	8.12	×	69.27		0.76	x	0.7	=	207.36	(79)
Southwestors 0.77 × 0.11 × 0.10 0.76 × 0.77 = 131.83 (79) Southwestors 0.77 × 5.31 × 31.49 0.76 × 0.77 = 55.57 (79) Southwestors 0.77 × 5.31 × 31.49 0.76 × 0.77 = 64.64 (79) Southwestors 0.77 × 8.12 × 31.49 0.76 × 0.77 = 94.26 (79) Northwestors 0.77 × 1.27 × 1128 × 0.76 × 0.77 = 5.28 (81) Northwestors 0.77 × 1.27 × 141.38 × 0.76 × 0.77 = 1.42 (81) Northwestors 0.77 × 1.27 × 41.38 × 0.76 × 0.77 = 1.42 (81) No	Southwest _{0.9x}	0.77	x	3.42	x	69.27		0.76	x	0.7	=	87.34	(79)
Southwesto.sx 0.77 × 3.42 × 44.07 0.76 × 0.77 = 55.57 (79) Southwesto.sx 0.77 × 5.31 × 31.49 0.76 × 0.77 = 61.64 (79) Southwesto.sx 0.77 × 3.42 × 31.49 0.76 × 0.77 = 94.26 (79) Northwesto.sx 0.77 × 0.69 × 112.8 × 0.76 × 0.77 = 94.26 (79) Northwesto.sx 0.77 × 1.27 × 112.8 × 0.76 × 0.77 = 5.84 (81) Northwesto.sx 0.77 × 1.27 × 2.287 × 0.76 × 0.77 = 1.27 × 41.38 × 0.76 × 0.77 = 10.53 (91) Northwesto.sx 0.77 × 1.27 × <	Southwest _{0.9x}	0.77	x	5.31	x	44.07		0.76	x	0.7	=	86.28	(79)
Southwestors 0.77 × 6.53 × 31.49 0.76 × 0.77 = 6.644 (79) Southwestors 0.77 × 8.12 × 31.49 0.76 × 0.77 = 94.26 (79) Southwestors 0.77 × 3.42 × 31.49 0.76 × 0.77 = 94.26 (79) Northwestors 0.77 × 0.68 × 11.28 × 0.76 × 0.77 = 5.27 (81) Northwestors 0.69 7.7 × 127 × 128 × 0.76 × 0.77 = 10.75 (81) Northwestors 0.77 × 0.668 × 0.76 × 0.77 = 11.27 (11.75 (81) Northwestors 0.77 × 0.68 × 0.76 × 0.77 = 11.27 (11.5 (11.5 (11.5	Southwest _{0.9x}	0.77	x	8.12	×	44.07		0.76	x	0.7	=	131.93	(79)
Southwesto sk 0.77 × 8.12 × 31.49 0.76 × 0.77 = 94.26 (79) Southwesto sk 0.77 × 0.89 × 11.28 × 0.76 × 0.77 = 2.87 (81) Northwesto sk 0.77 × 1.27 × 11.28 × 0.76 × 0.77 = 2.87 (81) Northwesto sk 0.77 × 1.27 × 22.97 × 0.76 × 0.77 = 5.28 (81) Northwesto sk 0.77 × 0.89 × 41.38 × 0.76 × 0.77 = 10.53 (81) Northwesto sk 0.77 × 0.69 × 47.88 0.76 × 0.77 = 11.27 × 41.38 × 0.76 × 0.77 = 31.82 (81) Northwesto sk 0.77 × 0.68 <t< td=""><td>Southwest_{0.9x}</td><td>0.77</td><td>x</td><td>3.42</td><td>x</td><td>44.07</td><td></td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>55.57</td><td>(79)</td></t<>	Southwest _{0.9x}	0.77	x	3.42	x	44.07		0.76	x	0.7	=	55.57	(79)
Southwestors, 0.77 x 31.49 0.76 x 0.77 = 33.7 (79) Northwestors, 0.77 x 0.69 x 11.28 x 0.76 x 0.7 = 2.87 (81) Northwestors, 0.77 x 1.27 x 11.28 x 0.76 x 0.7 = 5.28 (81) Northwestors, 0.8 0.77 x 0.69 x 2.297 x 0.76 x 0.7 = 5.84 (81) Northwestor, 0.8 0.77 x 0.69 x 41.38 x 0.76 x 0.7 = 10.53 (91) Northwestor, 0.8 0.77 x 0.69 x 67.96 x 0.7 = 11.62 (81) Northwestor, 0.8 0.77 x 0.69 x 97.95 x 0.7 = 24.277 (91) Northwestor, 0.8 0.77 x 0.69 x 97.93 x 0.76 x 0.7 = 24.27 (91)	Southwest0.9x	0.77	x	5.31	x	31.49		0.76	x	0.7	=	61.64	(79)
Northwest 0.sk 0.77 × 0.69 × 11.28 × 0.76 × 0.77 = 2.287 (61) Northwest 0.sk 0.77 × 1.27 × 11.28 × 0.76 × 0.77 = 5.28 (61) Northwest 0.sk 0.77 × 1.27 × 11.28 × 0.76 × 0.77 = 5.28 (61) Northwest 0.sk 0.77 × 0.69 × 0.76 × 0.77 = 10.75 (61) Northwest 0.sk 0.77 × 0.69 × 67.66 × 0.77 = 19.37 (61) Northwest 0.sk 0.77 × 1.27 × 67.96 × 0.77 = 23.24 (61) Northwest 0.sk 0.77 × 1.27 × 97.38 × 0.76 × 0.77 = 24.77 (61) Northwest 0.sk 0.7	Southwest0.9x	0.77	x	8.12	x	31.49		0.76	x	0.7	=	94.26	(79)
Northwest 0.5k 0.77 x 1.127 x 11.28 x 0.76 x 0.77 = 5.584 (81) Northwest 0.5k 0.77 x 0.69 x 22.97 x 0.76 x 0.77 = 5.644 (81) Northwest 0.5k 0.77 x 1.27 x 22.97 x 0.76 x 0.77 = 10.53 (81) Northwest 0.5k 0.77 x 0.69 x 0.76 x 0.77 = 11.27 (81) Northwest 0.5k 0.77 x 0.69 x 0.76 x 0.77 = 11.27 (81) Northwest 0.5k 0.77 x 0.69 x 97.38 x 0.76 x 0.77 = 23.24 (81) Northwest 0.5k 0.77 x 0.69 x 97.38 x 0.76 x 0.77 = 23.24 (81)	Southwest _{0.9x}	0.77	x	3.42	x	31.49		0.76	x	0.7	=	39.7	(79)
Northwest 0.9; 0.77 × 0.69 × 22.97 × 0.76 × 0.77 = 5.54 (61) Northwest 0.9; 0.77 × 1.27 × 22.97 × 0.76 × 0.77 = 10.75 (81) Northwest 0.9; 0.77 × 1.27 × 41.38 × 0.76 × 0.77 = 10.75 (81) Northwest 0.9; 0.77 × 1.27 × 41.38 × 0.76 × 0.77 = 19.37 (81) Northwest 0.9; 0.77 × 1.27 × 67.96 × 0.76 × 0.77 = 23.22 (81) Northwest 0.9; 0.77 × 1.27 × 91.35 × 0.76 × 0.77 = 23.22 (61) Northwest 0.9; 0.77 × 1.27 × 97.38 × 0.76 × 0.77 = 24.77 (61) Northwest 0.9; 0.77 × 1.27	Northwest 0.9x	0.77	x	0.69	x	11.28	x	0.76	x	0.7	=	2.87	(81)
Northwest 0.9 0.77 x 1.27 x 22.97 x 0.76 x 0.77 = 10.75 (01) Northwest 0.9x 0.77 x 1.27 x 41.38 x 0.76 x 0.77 = 10.53 (61) Northwest 0.9x 0.77 x 1.27 x 41.38 x 0.76 x 0.77 = 110.53 (61) Northwest 0.9x 0.77 x 0.69 x 67.96 x 0.76 x 0.77 = 112.29 (61) Northwest 0.9x 0.77 x 1.27 x 67.96 x 0.76 x 0.77 = 23.24 (91) Northwest 0.9x 0.77 x 1.27 x 97.38 x 0.76 x 0.77 = 24.77 (61) Northwest 0.9x 0.77 x 1.27 x 97.38 x 0.76 x 0.77 = 23.17 (61) Northwest 0.9x 0.77 x 1.27	Northwest 0.9x	0.77	x	1.27	x	11.28	x	0.76	x	0.7	=	5.28	(81)
Northwest 0.9x 0.77 × 0.689 × 41.38 × 0.76 × 0.77 = 10.53 (81) Northwest 0.9x 0.77 × 0.689 × 67.96 × 0.76 × 0.77 = 19.37 (81) Northwest 0.9x 0.77 × 0.689 × 67.96 × 0.76 × 0.77 = 19.37 (81) Northwest 0.9x 0.77 × 1.27 × 67.96 × 0.76 × 0.77 = 23.24 (81) Northwest 0.9x 0.77 × 1.27 × 91.35 × 0.76 × 0.77 = 24.77 (81) Northwest 0.9x 0.77 × 1.27 × 97.38 × 0.76 × 0.77 = 24.77 (81) Northwest 0.9x 0.77 × 1.27 97.38 × 0.76 × 0.77 =	Northwest 0.9x	0.77	x	0.69	x	22.97	x	0.76	x	0.7	=	5.84	(81)
Northwest 0.9x 0.77 × 1.27 × 41.38 × 0.76 × 0.77 = 19.37 (61) Northwest 0.9x 0.77 × 0.69 × 67.96 × 0.76 × 0.77 = 117.29 (81) Northwest 0.9x 0.77 × 1.27 × 67.96 × 0.76 × 0.77 = 31.82 (81) Northwest 0.9x 0.77 × 0.69 × 91.35 × 0.76 × 0.77 = 23.24 (81) Northwest 0.9x 0.77 × 1.27 × 97.38 × 0.76 × 0.7 = 24.77 (61) Northwest 0.9x 0.77 × 1.27 × 97.38 × 0.76 × 0.7 = 23.17 (61) Northwest 0.9x 0.77 × 1.27 Y 91.1 × 0.76 × 0.7	Northwest 0.9x	0.77	x	1.27	x	22.97	x	0.76	x	0.7	=	10.75	(81)
Northwest 0.5x 0.77 x 0.69 x 67.96 x 0.76 x 0.77 = 17.29 (61) Northwest 0.9x 0.77 x 1.27 x 67.96 x 0.76 x 0.77 = 31.82 (61) Northwest 0.9x 0.77 x 0.69 x 91.35 x 0.76 x 0.77 = 23.24 (61) Northwest 0.9x 0.77 x 1.27 x 91.35 x 0.76 x 0.77 = 24.77 (61) Northwest 0.9x 0.77 x 1.27 x 97.38 x 0.76 x 0.77 = 24.77 (61) Northwest 0.9x 0.77 x 0.69 x 97.38 x 0.76 x 0.77 = 23.17 (61) Northwest 0.9x 0.77 x 0.69 x 72.63 x 0.76 x 0.77	Northwest 0.9x	0.77	x	0.69	x	41.38	x	0.76	x	0.7	=	10.53	(81)
Northwest 0.9x 0.77 × 1.27 × 67.96 × 0.76 × 0.77 = 31.82 (61) Northwest 0.9x 0.77 × 0.69 × 91.35 × 0.76 × 0.7 = 23.24 (61) Northwest 0.9x 0.77 × 1.27 × 91.35 × 0.76 × 0.7 = 23.24 (61) Northwest 0.9x 0.77 × 0.69 × 97.38 × 0.76 × 0.7 = 24.77 (61) Northwest 0.9x 0.77 × 0.69 × 97.38 × 0.76 × 0.7 = 23.17 (61) Northwest 0.9x 0.77 × 1.27 × 91.1 × 0.76 × 0.7 = 18.48 (61) Northwest 0.9x 0.77 × 1.27 × 72.63 × 0.76 × 0.7 <td< td=""><td>Northwest 0.9x</td><td>0.77</td><td>x</td><td>1.27</td><td>x</td><td>41.38</td><td>x</td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>19.37</td><td>(81)</td></td<>	Northwest 0.9x	0.77	x	1.27	x	41.38	x	0.76	x	0.7	=	19.37	(81)
Northwest 0.5% 0.77 × 0.69 × 91.35 × 0.76 × 0.7 = 23.24 (f) Northwest 0.5% 0.77 × 1.27 × 91.35 × 0.76 × 0.7 = 42.77 (f) Northwest 0.5% 0.77 × 0.69 × 97.38 × 0.76 × 0.77 = 42.77 (f) Northwest 0.5% 0.77 × 1.27 × 97.38 × 0.76 × 0.77 = 445.6 (f) Northwest 0.5% 0.77 × 1.27 × 97.38 × 0.76 × 0.77 = 42.66 (f) Northwest 0.5% 0.77 × 1.27 × 72.63 × 0.76 × 0.77 = 14.848 (f) Northwest 0.5% 0.77 × 1.27 × 50.42 × 0.76 × 0.77 <td< td=""><td>Northwest 0.9x</td><td>0.77</td><td>x</td><td>0.69</td><td>x</td><td>67.96</td><td>x</td><td>0.76</td><td>×</td><td>0.7</td><td>=</td><td>17.29</td><td>(81)</td></td<>	Northwest 0.9x	0.77	x	0.69	x	67.96	x	0.76	×	0.7	=	17.29	(81)
Northwest 0.9x 0.77 x 1.27 x 91.35 x 0.76 x 0.77 x 1.27 x 91.35 x 0.76 x 0.77 = 42.77 (81) Northwest 0.9x 0.77 x 1.27 x 97.38 x 0.76 x 0.77 = 24.77 (81) Northwest 0.9x 0.77 x 1.27 x 97.38 x 0.76 x 0.77 = 24.77 (81) Northwest 0.9x 0.77 x 0.69 x 91.11 x 0.76 x 0.77 = 42.66 (81) Northwest 0.9x 0.77 x 0.69 x 72.63 x 0.76 x 0.7 = 18.48 (81) (81) Northwest 0.9x 0.77 x 0.69 x 50.42 x 0.76 x 0.7 = 12.83 (81) Northwest 0.9x 0.77 x 0.69 x 28.07 x 0.76 x 0.7	Northwest 0.9x	0.77	x	1.27	x	67.96	x	0.76	x	0.7	=	31.82	(81)
Northwest 0.9x 0.77 x 0.69 x 97.38 x 0.76 x 0.77 = 24.77 (81) Northwest 0.9x 0.77 x 1.27 x 97.38 x 0.76 x 0.77 = 24.77 (81) Northwest 0.9x 0.77 x 0.69 x 91.1 x 0.76 x 0.77 = 23.17 (81) Northwest 0.9x 0.77 x 1.27 x 91.1 x 0.76 x 0.77 = 23.17 (81) Northwest 0.9x 0.77 x 1.27 x 91.1 x 0.76 x 0.77 = 18.48 (81) Northwest 0.9x 0.77 x 1.27 x 72.63 x 0.76 x 0.77 = 12.83 (81) Northwest 0.9x 0.77 x 1.27 x 50.42 x 0.76 x 0.77 = 23.61 (81) Northwest 0.9x 0.77 x 1.27 <t< td=""><td>Northwest 0.9x</td><td>0.77</td><td>x</td><td>0.69</td><td>x</td><td>91.35</td><td>x</td><td>0.76</td><td>x</td><td>0.7</td><td>=</td><td>23.24</td><td>(81)</td></t<>	Northwest 0.9x	0.77	x	0.69	x	91.35	x	0.76	x	0.7	=	23.24	(81)
Northwest $0.9x$ 0.77x1.27x97.38x0.76x0.7=45.6(61)Northwest $0.9x$ 0.77x0.69x91.1x0.76x0.7=23.17(61)Northwest $0.9x$ 0.77x1.27x91.1x0.76x0.7=42.66(81)Northwest $0.9x$ 0.77x1.27x91.1x0.76x0.7=42.66(81)Northwest $0.9x$ 0.77x0.69x72.63x0.76x0.7=18.48(81)Northwest $0.9x$ 0.77x1.27x72.63x0.76x0.7=12.83(81)Northwest $0.9x$ 0.77x1.27x72.63x0.76x0.7=12.83(81)Northwest $0.9x$ 0.77x1.27x50.42x0.76x0.7=12.83(81)Northwest $0.9x$ 0.77x1.27x50.42x0.76x0.7=12.83(81)Northwest $0.9x$ 0.77x0.69x28.07x0.76x0.7=13.14(81)Northwest $0.9x$ 0.77x1.27x28.07x0.76x0.7=13.14(81)Northwest $0.9x$ 0.77x1.27x28.07x0.	Northwest 0.9x	0.77	x	1.27	x	91.35	x	0.76	x	0.7	=	42.77	(81)
Northwest 0.9x 0.77 × 0.69 × 91.1 × 0.76 × 0.77 = 23.17 (61) Northwest 0.9x 0.77 × 1.27 × 91.1 × 0.76 × 0.77 = 42.66 (61) Northwest 0.9x 0.77 × 0.69 × 72.63 × 0.76 × 0.77 = 18.48 (61) Northwest 0.9x 0.77 × 1.27 × 72.63 × 0.76 × 0.77 = 18.48 (61) Northwest 0.9x 0.77 × 1.27 × 50.42 × 0.76 × 0.77 = 12.83 (81) Northwest 0.9x 0.77 × 1.27 × 50.42 × 0.76 × 0.77 = 23.61 (81) Northwest 0.9x 0.77 × 1.27 × 28.07 × 0.76 × 0.77	Northwest 0.9x	0.77	x	0.69	x	97.38	x	0.76	x	0.7	=	24.77	(81)
Northwest 0.9x 0.77 x 1.27 x 91.1 x 0.76 x 0.77 = 42.66 (81) Northwest 0.9x 0.77 x 0.69 x 72.63 x 0.76 x 0.77 = 18.48 (81) Northwest 0.9x 0.77 x 1.27 x 72.63 x 0.76 x 0.77 = 18.48 (81) Northwest 0.9x 0.77 x 1.27 x 72.63 x 0.76 x 0.77 = 34.01 (81) Northwest 0.9x 0.77 x 1.27 x 50.42 x 0.76 x 0.77 = 23.61 (81) Northwest 0.9x 0.77 x 1.27 x 28.07 x 0.76 x 0.77 = 13.14 (81) Northwest 0.9x 0.77 x 1.27 28.07 x 0.76 x 0.77 = 13.14 (81) Northwest 0.9x 0.77 x 1.27 28.07	Northwest 0.9x	0.77	x	1.27	x	97.38	x	0.76	x	0.7	=	45.6	(81)
Northwest $0.9x$ 0.77 x 0.69 x 72.63 x 0.76 x 0.7 $=$ 18.48 (81) Northwest $0.9x$ 0.77 x 1.27 x 72.63 x 0.76 x 0.7 $=$ 34.01 (81) Northwest $0.9x$ 0.77 x 0.69 x 50.42 x 0.76 x 0.7 $=$ 12.83 (81) Northwest $0.9x$ 0.77 x 0.69 x 50.42 x 0.76 x 0.7 $=$ 12.83 (81) Northwest $0.9x$ 0.77 x 1.27 x 50.42 x 0.76 x 0.7 $=$ 23.61 (81) Northwest $0.9x$ 0.77 x 0.69 x 28.07 x 0.76 x 0.7 $=$ 7.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 13.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 13.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 13.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 3.61 (81) Northwest $0.9x$ 0.77	Northwest 0.9x	0.77	x	0.69	x	91.1	x	0.76	x	0.7	=	23.17	(81)
Northwest $0.9x$ 0.77 x 1.27 x 72.63 x 0.76 x 0.7 $=$ 34.01 (81) Northwest $0.9x$ 0.77 x 0.69 x 50.42 x 0.76 x 0.7 $=$ 12.83 (81) Northwest $0.9x$ 0.77 x 1.27 x 50.42 x 0.76 x 0.7 $=$ 23.61 (81) Northwest $0.9x$ 0.77 x 1.27 x 50.42 x 0.76 x 0.7 $=$ 23.61 (81) Northwest $0.9x$ 0.77 x 0.69 x 28.07 x 0.76 x 0.7 $=$ 7.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 7.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 3.61 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 2.34 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 2.34 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 $=$ 4.31 (81) Northwest $0.9x$ 0.77	Northwest 0.9x	0.77	x	1.27	x	91.1	x	0.76	x	0.7	=	42.66	(81)
Northwest 0.9x 0.77 x 0.69 x 50.42 x 0.76 x 0.7 = 12.83 (81) Northwest 0.9x 0.77 x 1.27 x 50.42 x 0.76 x 0.7 = 12.83 (81) Northwest 0.9x 0.77 x 1.27 x 50.42 x 0.76 x 0.7 = 23.61 (81) Northwest 0.9x 0.77 x 0.69 x 28.07 x 0.76 x 0.7 = 7.14 (81) Northwest 0.9x 0.77 x 1.27 x 28.07 x 0.76 x 0.7 = 13.14 (81) Northwest 0.9x 0.77 x 1.27 x 28.07 x 0.76 x 0.7 = 6.65 (81) Northwest 0.9x 0.77 x 1.27 x 14.2 x 0.76 x 0.7 = 2.34 (81) Northwest 0.9x 0.77 x 1.27 x	Northwest 0.9x	0.77	x	0.69	×	72.63	x	0.76	×	0.7] =	18.48	(81)
Northwest $0.9x$ 0.77 x 1.27 x 50.42 x 0.76 x 0.7 z 23.61 (81) Northwest $0.9x$ 0.77 x 0.69 x 28.07 x 0.76 x 0.7 $=$ 23.61 (81) Northwest $0.9x$ 0.77 x 0.69 x 28.07 x 0.76 x 0.7 $=$ 7.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 13.14 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 3.61 (81) Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 $=$ 3.61 (81) Northwest $0.9x$ 0.77 x 1.27 x 14.2 x 0.76 x 0.7 $=$ 2.34 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 $=$ 2.34 (81) Northwest $0.9x$ 0.77 x 12.74 x 20.24 x 0.76 x 0.7 $=$ 123.44 (82) Rooflights $0.9x$ 1 x 12.74 x 40.55 x 0.76 x 0.7 $=$ 247.33 (82) Rooflights $0.9x$ 1	L	0.77	x	1.27	x	72.63	x	0.76	x	0.7	=	34.01	(81)
Northwest 0.9x 0.77 x 0.69 x 28.07 x 0.76 x 0.77 = 7.14 (81) Northwest 0.9x 0.77 x 1.27 x 28.07 x 0.76 x 0.77 = 7.14 (81) Northwest 0.9x 0.77 x 1.27 x 28.07 x 0.76 x 0.77 = 13.14 (81) Northwest 0.9x 0.77 x 0.69 x 14.2 x 0.76 x 0.77 = 3.61 (81) Northwest 0.9x 0.77 x 1.27 x 14.2 x 0.76 x 0.77 = 6.65 (81) Northwest 0.9x 0.77 x 1.27 x 9.21 x 0.76 x 0.77 = 2.34 (81) Northwest 0.9x 0.77 x 1.27 x 9.21 x 0.76 x 0.77 = 4.31 (81) Rooflights 0.9x 1 x 12.74 x	L	0.77	x	0.69	x	50.42	x	0.76	x	0.7	=	12.83	(81)
Northwest $0.9x$ 0.77 x 1.27 x 28.07 x 0.76 x 0.7 = 13.14 (81)Northwest $0.9x$ 0.77 x 0.69 x 14.2 x 0.76 x 0.7 = 3.61 (81)Northwest $0.9x$ 0.77 x 1.27 x 14.2 x 0.76 x 0.7 = 3.61 (81)Northwest $0.9x$ 0.77 x 1.27 x 14.2 x 0.76 x 0.7 = 6.65 (81)Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 = 2.34 (81)Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 = 4.31 (81)Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 = 4.31 (81)Northwest $0.9x$ 0.77 x 1.274 x 20.24 x 0.76 x 0.7 = 123.44 (82)Rooflights $0.9x$ 1x 12.74 x 74.78 x 0.76 x 0.7 = 247.33 (82)Rooflights $0.9x$ 1x 12.74 x 130.19 x 0.76 x 0.7 = 1131.49 (82)Rooflights $0.9x$ 1x 12.74 x 183.82 x 0.76 x 0.7 = 1221.24 <td>L</td> <td>0.77</td> <td>x</td> <td>1.27</td> <td>x</td> <td>50.42</td> <td>x</td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>23.61</td> <td>(81)</td>	L	0.77	x	1.27	x	50.42	x	0.76	x	0.7	=	23.61	(81)
Northwest $0.9x$ 0.77 x 0.69 x 14.2 x 0.76 x 0.7 $=$ 3.61 (81) Northwest $0.9x$ 0.77 x 1.27 x 14.2 x 0.76 x 0.7 $=$ 6.65 (81) Northwest $0.9x$ 0.77 x 1.27 x 14.2 x 0.76 x 0.7 $=$ 6.65 (81) Northwest $0.9x$ 0.77 x 0.69 x 9.21 x 0.76 x 0.7 $=$ 2.34 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 $=$ 4.31 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 $=$ 4.31 (81) Northwest $0.9x$ 0.77 x 1.274 x 20.24 x 0.76 x 0.7 $=$ 4.31 (82) Rooflights $0.9x$ 1 x 12.74 x 40.55 x 0.76 x 0.7 $=$ 247.33 (82) Rooflights $0.9x$ 1 x 12.74 x 130.19 x 0.76 x 0.7 $=$ 794.13 (82) Rooflights $0.9x$ 1 x 12.74 x 183.82 x 0.76 x 0.7 $=$ 1121.29 (82) Rooflights $0.9x$ 1	L	0.77	x	0.69	x	28.07	x	0.76	x	0.7	=	7.14	(81)
Northwest $0.9x$ 0.77 x 1.27 x 14.2 x 0.76 x 0.7 = 6.65 (81) Northwest $0.9x$ 0.77 x 0.69 x 9.21 x 0.76 x 0.7 = 2.34 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 = 4.31 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 = 4.31 (81) Rooflights $0.9x$ 1x 12.74 x 20.24 x 0.76 x 0.7 = 123.44 (82) Rooflights $0.9x$ 1x 12.74 x 40.55 x 0.76 x 0.7 = 247.33 (82) Rooflights $0.9x$ 1x 12.74 x 74.78 x 0.76 x 0.7 = 456.16 (82) Rooflights $0.9x$ 1x 12.74 x 130.19 x 0.76 x 0.7 = 1121.29 (82) Rooflights $0.9x$ 1x 12.74 x 183.82 x 0.76 x 0.7 = 1121.29 (82) Rooflights $0.9x$ 1x 12.74 x 185.57 x 0.76 x 0.7 = 1121.29 (82) Rooflights $0.9x$ 1x 12.74 x 185.57 x 0.76 x 0.7 = <td>Ľ</td> <td>0.77</td> <td>x</td> <td>1.27</td> <td>x</td> <td>28.07</td> <td>x</td> <td>0.76</td> <td>x</td> <td>0.7</td> <td>=</td> <td>13.14</td> <td>(81)</td>	Ľ	0.77	x	1.27	x	28.07	x	0.76	x	0.7	=	13.14	(81)
Northwest $0.9x$ 0.77 x 0.69 x 9.21 x 0.76 x 0.7 $=$ 2.34 (81) Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 $=$ 4.31 (81) Rooflights $0.9x$ 1 x 12.74 x 20.24 x 0.76 x 0.7 $=$ 123.44 (82) Rooflights $0.9x$ 1 x 12.74 x 20.24 x 0.76 x 0.7 $=$ 247.33 (82) Rooflights $0.9x$ 1 x 12.74 x 74.78 x 0.76 x 0.7 $=$ 456.16 (82) Rooflights $0.9x$ 1 x 12.74 x 130.19 x 0.76 x 0.7 $=$ 794.13 (82) Rooflights $0.9x$ 1 x 12.74 x 183.82 x 0.76 x 0.7 $=$ 1121.29 (82) Rooflights $0.9x$ 1 x 12.74 x 200.21 x 0.76 x 0.7 $=$ 1121.29 (82) Rooflights $0.9x$ 1 x 12.74 x 185.57 x 0.76 x 0.7 $=$ 1131.99 (82)	L	0.77	x	0.69	×	14.2	x	0.76	×	0.7	=	3.61	(81)
Northwest $0.9x$ 0.77 x 1.27 x 9.21 x 0.76 x 0.7 = 4.31 (81)Rooflights $0.9x$ 1x 12.74 x 20.24 x 0.76 x 0.7 = 123.44 (82)Rooflights $0.9x$ 1x 12.74 x 20.24 x 0.76 x 0.7 = 123.44 (82)Rooflights $0.9x$ 1x 12.74 x 40.55 x 0.76 x 0.7 = 247.33 (82)Rooflights $0.9x$ 1x 12.74 x 74.78 x 0.76 x 0.7 = 456.16 (82)Rooflights $0.9x$ 1x 12.74 x 130.19 x 0.76 x 0.7 = 794.13 (82)Rooflights $0.9x$ 1x 12.74 x 183.82 x 0.76 x 0.7 = 1121.29 (82)Rooflights $0.9x$ 1x 12.74 x 185.57 x 0.76 x 0.7 = 1121.29 (82)Rooflights $0.9x$ 1x 12.74 x 185.57 x 0.76 x 0.7 = 1131.99 (82)	L	0.77	x	1.27	x	14.2	x	0.76	x	0.7	=	6.65	(81)
Rooflights $0.9x$ 1x12.74x20.24x0.76x0.7=123.44(82)Rooflights $0.9x$ 1x12.74x40.55x0.76x0.7=247.33(82)Rooflights $0.9x$ 1x12.74x74.78x0.76x0.7=456.16(82)Rooflights $0.9x$ 1x12.74x74.78x0.76x0.7=456.16(82)Rooflights $0.9x$ 1x12.74x130.19x0.76x0.7=794.13(82)Rooflights $0.9x$ 1x12.74x183.82x0.76x0.7=1121.29(82)Rooflights $0.9x$ 1x12.74x200.21x0.76x0.7=1221.24(82)Rooflights $0.9x$ 1x12.74x185.57x0.76x0.7=1131.99(82)Rooflights $0.9x$ 1x12.74x185.57x0.76x0.7=1131.99(82)	Ľ	0.77	x	0.69	×	9.21	x	0.76	x	0.7	=	2.34	(81)
Rooflights $0.9x$ 1x12.74x40.55x0.76x0.7=247.33(82)Rooflights $0.9x$ 1x12.74x74.78x0.76x0.7=456.16(82)Rooflights $0.9x$ 1x12.74x130.19x0.76x0.7=794.13(82)Rooflights $0.9x$ 1x12.74x138.82x0.76x0.7=1121.29(82)Rooflights $0.9x$ 1x12.74x200.21x0.76x0.7=1221.24(82)Rooflights $0.9x$ 1x12.74x185.57x0.76x0.7=1131.99(82)	L	0.77	x	1.27	×	9.21	x	0.76	×	0.7	=	4.31	(81)
Rooflights $0.9x$ 1x12.74x74.78x0.76x0.7=456.16(82)Rooflights $0.9x$ 1x12.74x130.19x0.76x0.7=794.13(82)Rooflights $0.9x$ 1x12.74x183.82x0.76x0.7=1121.29(82)Rooflights $0.9x$ 1x12.74x183.82x0.76x0.7=1121.29(82)Rooflights $0.9x$ 1x12.74x200.21x0.76x0.7=1221.24(82)Rooflights $0.9x$ 1x12.74x185.57x0.76x0.7=1131.99(82)	L	1	x	12.74	x	20.24	x	0.76	x	0.7	=	123.44	(82)
Rooflights $0.9x$ 1×12.74×130.19×0.76×0.7=794.13(82)Rooflights $0.9x$ 1×12.74×183.82×0.76×0.7=1121.29(82)Rooflights $0.9x$ 1×12.74×200.21×0.76×0.7=1221.24(82)Rooflights $0.9x$ 1×12.74×185.57×0.76×0.7=1131.99(82)Rooflights $0.9x$ 1×12.74×185.57×0.76×0.7=1131.99(82)	L	1	x	12.74	×	40.55	x	0.76	x	0.7	=	247.33	(82)
Rooflights $0.9x$ 1 x 12.74 x 183.82 x 0.76 x 0.7 = 1121.29 (82) Rooflights $0.9x$ 1 x 12.74 x 200.21 x 0.76 x 0.7 = 1121.29 (82) Rooflights $0.9x$ 1 x 12.74 x 200.21 x 0.76 x 0.7 = 1221.24 (82) Rooflights $0.9x$ 1 x 12.74 x 185.57 x 0.76 x 0.7 = 1131.99 (82)	L	1	x	12.74	×	74.78	x	0.76	×	0.7	=	456.16	(82)
Rooflights $0.9x$ 1 x 12.74 x 200.21 x 0.76 x 0.7 = 1221.24 (82) Rooflights $0.9x$ 1 x 12.74 x 185.57 x 0.76 x 0.7 = 1131.99 (82)	L	1	x	12.74	×	130.19	x	0.76	×	0.7	=	794.13	(82)
Rooflights $0.9x$ 1 x 12.74 x 185.57 x 0.76 x 0.7 = 1131.99 (82)	L	1	x	12.74	×	183.82	x	0.76	×	0.7	=	1121.29	(82)
	L	1	x	12.74	×	200.21	x	0.76	×	0.7	=	1221.24	(82)
Rooflights 0.9x 1 x 12.74 x 142.19 x 0.76 x 0.7 = 867.36 (82)	L	1	x	12.74	×	185.57	x	0.76	×	0.7	=	1131.99	4
	Rooflights 0.9x	1	×	12.74	×	142.19	x	0.76	×	0.7	=	867.36	(82)



Rooflights 0.	9x 1		x 12	.74	×	93.09	٦ ×		0.76	ר × ר	0.7		567.83	(82)
Rooflights 0.				.74	x	49.71] ^] x		0.76	^ L 	0.7		303.23	(82)
Rooflights 0.				.74		25.27	」 ^] x			^ L 	0.7			(82)
Rooflights 0.							4		0.76	늭			154.14	4
rtoonignto ().	9x 1		x 12	.74	x	16.69	x		0.76	×	0.7	=	101.83	(82)
	in watta	alaulat	od for oor	h month			(92)m		um(74)m .	(82)m				
Solar gains (83)m= 402	1	1	6 1756.84	i	1	2 2245.34	<u> </u>		1369.2	858.54	491.14	338.48		(83)
Total gains											-			. ,
(84)m= 898			6 2204.81	2685.2	1 /	2 2616.22	2217	7.48	1762.8	1281	946.82	819.7		(84)
7 Mean ir	nternal terr	peratur	e (heating	n season				1			1	1	1	
	ure during					from Ta	ble 9	Th	1 (°C)				21	(85)
•	factor for	-	•		-			,	. (0)				21	(00)
Ja		Ma		May	Jun	Jul	A	ug	Sep	Oct	Nov	Dec		
(86)m= 1		0.94	0.79	0.56	0.38	0.28	0.3	-	0.62	0.93	0.99	1		(86)
					1			I						
	rnal tempe	-		<u> </u>	1		1			00.00	00.00	40.05	1	(87)
(87)m= 19.	71 20	20.41	20.81	20.97	21	21	2	1	20.96	20.63	20.06	19.65		(07)
Temperat	ure during	heating	periods i	n rest of	dwellin	g from Ta	able 9	9, Tł	n2 (°C)					
<mark>(88)</mark> m= 19	.9 19.9	19.9	19.91	19.91	19.91	19.91	19.	91	19.91	19.91	19.91	19.91		(88)
Utilisation	factor for	gains fo	r rest of c	lwelling,	h2,m (s	ee Table	9a)							
(89)m= 1	0.98	0.93	0.75	0.5	0.32	0.21	0.2	26	0.54	0.9	0.99	1		(89)
Mean inte	rnal tempe	erature i	n the rest	of dwell	ina T2 (follow ste	eps 3	to 7	7 in Tabl	e 9c)	•	•		
(90)m= 18.		19.19	T	19.88	19.91	19.91	19.		19.89	19.51	18.71	18.11		(90)
	Į	-							f	LA = Livii	ng area ÷ (4) =	0.47	(91)
Mean inte	rnal tempe	vratura	for the w	ole dwe	lling) –	fl A 🗸 T1	⊥ (1	_ fl	۸) v T2					
(92)m= 18		19.76	<u> </u>	20.39	20.42	20.42	20.		20.39	20.03	19.34	18.83]	(92)
	ustment to					-					10.01	10.00		
(93)m= 18		19.76		20.39	20.42	20.42	20.		20.39	20.03	19.34	18.83		(93)
	heating rea													
	he mean i	•		ire obtair	ned at s	tep 11 of	Tabl	le 9b	o, so tha	t Ti,m=((76)m an	d re-cald	culate	
	tion factor								<i>.</i>					
Ja	an Feb	Ма	r Apr	May	Jun	Jul	A	ug	Sep	Oct	Nov	Dec		
Utilisation	factor for	gains, h	m:											
<mark>(94)</mark> m= 0.9	99 0.98	0.93	0.76	0.53	0.35	0.24	0.3	3	0.57	0.9	0.99	1		(94)
	ins, hmGr	-	<u> </u>	<u>, </u>		_							1	
<mark>(95)</mark> m= 894	.03 1208.4	9 1527.0	1 1676.03	1417.86	965.62	636.04	667	.94	1012.99	1155.07	934.28	816.88		(95)
	verage ex	ernal te	mperatur	e from T	able 8		<u> </u>						1	
(96)m= 4.		6.5	8.9	11.7	14.6	16.6	16		14.1	10.6	7.1	4.2		(96)
	rate for m	1	· · ·	1	1	1	1	<u> </u>					1	·
	9.91 2416.3			1453.69			669		1049.69			2456.05		(97)
	ating requi	1	1	1	1	1	1	Ì			1	1	1	
(98)m= 1165	5.01 811.7	522.8	158.7	26.66	0	0	0		0	314.52	804.68	1219.55		-
								Total	l per year ((kWh/yea	r) = Sum(9	(8) _{15,912} =	5023.63	(98)
Space he	ating requi	rement	in kWh/m	²/year									36.47	(99)



9a. En	ergy rec	luiremer	nts – Ind	ividual h	eating sy	ystems i	ncluding	micro-C	HP)					
•	e heatir	•												٦
				econdar		mentary			(004)				0	(201)
	-			nain syst				(202) = 1 -		(222)]			1	(202)
			-	main sys				(204) = (2	02) × [1 – 1	(203)] =			1	(204)
	•	-		ing syste									90.4	(206)
Effici	ency of s	seconda	ry/suppl	ementar	y heating	g system	ז, %						0	(208)
	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Spac			· · · · ·						0	044.50	004.00	4040 55		
	1165.01	811.7	522.8	158.7	26.66	0	0	0	0	314.52	804.68	1219.55		
(211)n	ר = {[(98 1288.73)m x (20 897.9	4)] } x 1 578.32	00 ÷ (20 175.56)6) 29.49	0	0	0	0	347.92	890.13	1349.05		(211)
	1200.75	097.9	576.52	175.50	29.49	0	0		l (kWh/yea				5557.11	(211)
Snac	e heatin	a fuel (s	econdar	y), kWh/	month						/15,1012		5557.11	
•)1)]}x1		• •	monun									
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		
	<u>.</u>							Tota	l (kWh/yea	ar) =Sum(2	2 15) _{15,1012}	=	0	(215)
Water	heating	J												_
Outpu	t from w	ater hea 193.52		ulated a		155.75	149.22	166.04	167.53	188.73	100 71	014.07		
Efficie		ater hea	203.15	162	176.84	155.75	149.22	166.34	107.55	100.73	199.71	214.27	80.3	(216)
(217)m=	-	88.26	87.33	84.71	81.49	80.3	80.3	80.3	80.3	86.33	88.19	88.73	00.0	(217)
		heating,			0.110	0010		0010	0010	00.00	00110	00110		
		m x 100					1	r						
(219)m=	247.76	219.25	232.64	214.86	217	193.96	185.83	207.15	208.64	218.62	226.44	241.48		-
_								Tota	I = Sum(2 ⁻				2613.61	(219)
	al totals	fueluse	nd main	system	1					k	Wh/year		kWh/year 5557.11	1
•	Ū			System										J
	-	fuel use											2613.61	
Electri	city for p	oumps, fa	ans and	electric	keep-ho	t								
centra	al heatin	ig pump:	:									30		(230c)
boile	with a f	an-assis	sted flue									45		(230e)
Total e	electricity	/ for the	above, l	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
Electri	city for li	ghting										ĺ	483.11	(232)
12a.	CO2 em	issions -	– Individ	ual heat	ing syste	ems inclu	uding mi	cro-CHF)					_
							ergy /h/year			Emiss kg CO2	ion fac 2/kWh	tor	Emissions kg CO2/yea	ır
Space	heating	(main s	vstem 1)			1) x			0.2		=	1200.34	(261)
	-	(second	-	/			5) x					=		(263)
•	•	1000010	iaiy)				9) x			0.5		= [0	
	heating	tor heat	na					+ (263) + (264) -	0.2	16	-	564.54	(264)
Space	anu wa	ter heati	ng			(20	1) + (202)	- (203) + (204) =				1764.88	(265)



Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	250.74 (268)
Energy saving/generation technologies Total CO2, kg/year		sum of (265)(271) =	2054.54 (272)
Dwelling CO2 Emission Rate		(272) ÷ (4) =	14.91 (273)
EI rating (section 14)			85 (274)



					User I	Details:						
Assessor Nam	e: Pe	ter Mitch	nell			Strom	a Num	ber:		STRO	007945	
Software Name	-	roma FS	AP 201	2			are Ver			Versio	on: 1.0.3.15	
				P	roperty	Address	s: Unit 1 (GF&FF	END) LE	EAN		
Address :	Ne	w Dwellir	ng at:, G	ordon Ho	ouse, 6	Lissend	len Garde	ens, LOI	NDON, M	W5 1LX	(
1. Overall dwelling												
	Volume(m ³)	_										
Ground floor		2	2.4	(2a) =	176.69	(3a)						
First floor						64.14	(1b) x	3	.32	(2b) =	212.94	(3b)
Total floor area TF	A = (1a)+(1	b)+(1c)+	(1d)+(1e	e)+(1n	i) /	137.76	(4)					
Dwelling volume							(3a)+(3b))+(3c)+(3c	l)+(3e)+	.(3n) =	389.63	(5)
2. Ventilation rate												
		main heating		econdar heating	У	other		total			m ³ per hou	•
Number of chimney		0	+	0	+	0	=	0	X 4	40 =	0	(6a)
Number of open flu	es	0	+	0] + [0] = [0	x 2	20 =	0	(6b)
Number of intermit	ent fans							4	x ′	0 =	40	(7a)
Number of passive	vents						Г	0	x ′	0 =	0	(7b)
Number of flueless	gas fires						Γ	0	x 4	40 =	0	(7c)
							L					_
										Air ch	anges per ho	ur
Infiltration due to cl	•						fr	40		÷ (5) =	0.1	(8)
If a pressurisation tes Number of store				ea, proceec	a to (17),	otherwise	continue tr	om (9) to ((16)		0	(9)
Additional infiltra		ioning (in	~)						[(9)-	1]x0.1 =	0	(10)
Structural infiltrat	ion: 0.25 fc	or steel o	timber	frame or	0.35 fc	or mason	ry constr	uction		1	0	(11)
if both types of wa				ponding to	the grea	ter wall ar	ea (after					_
deducting areas o If suspended wo				ed) or 0	1 (seal	ed) else	enter 0				0	(12)
If no draught lob			•	ou) oi oi	. (000	04), 0100					0	(13)
Percentage of wi	•			ripped							0	(14)
Window infiltration	n		-			0.25 - [0.	2 x (14) ÷ 1	= [00			0	(15)
Infiltration rate						(8) + (10)	+ (11) + (1	2) + (13) -	+ (15) =		0	(16)
Air permeability		•			•	•	•	etre of e	envelope	area	5	(17)
If based on air perr	•										0.35	(18)
Air permeability value		pressurisatio	on test has	s been don	e or a de	egree air pe	ermeability	is being u	sed		_	
Number of sides sh Shelter factor	leitered					(20) = 1 -	[0.075 x (1	9)] =			3 0.78	(19) (20)
Infiltration rate inco	rporating s	helter fac	tor			(21) = (18	3) x (20) =				0.27	(21)
Infiltration rate mod				ł								` ´
Jan Fe	eb Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average w	ind speed f	rom Tabl	e 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 F	actor (2	22a)m =	(22)m ÷	4										
(22a)m=	1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18		
Adjuste	ed infiltra	ation rate	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m					
	0.35	0.34	0.33	0.3	0.29	0.26	0.26	0.25	0.27	0.29	0.31	0.32]	
		c <i>tive air (</i> al ventila	-	rate for t	he appli	cable ca	se						0	(23a)
				endix N. (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) . othe	rwise (23b) = (23a)			0	(23a)
						or in-use fa				, (,			0	(23c)
			-	-	-	at recove				2b)m + (23b) x [′	1 – (23c)	_	(200)
(24a)m=	0	0	0	0	0	0	0	0	0	0	0	0]	(24a)
b) If I	balance	d mecha	anical ve	entilation	without	heat rec	covery (N	и V) (24b	m = (22)	2b)m + (2	23b)		1	
, (24b)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24b)
c) If v	whole h	ouse ex	tract ver	tilation o	or positiv	/e input \	/entilatic	n from c	outside					
i	f (22b)n	n < 0.5 ×	(23b), t	hen (24	c) = (23b	o); otherv	vise (24	c) = (22b	o) m + 0.	.5 × (23b))		_	
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24c)
,						ve input v erwise (2				0.5]				
(24d)m=	0.56	0.56	0.56	0.55	0.54	0.53	0.53	0.53	0.54	0.54	0.55	0.55		(24d)
Effec	tive air	change	rate - er	nter (24a) or (24	o) or (24	c) or (24	d) in boy	x (25)					
(25)m=	0.56	0.56	0.56	0.55	0.54	0.53	0.53	0.53	0.54	0.54	0.55	0.55		(25)
3. Hea	at losse	s and he	eat loss r	paramete	er:									
		s and he Gros		oaramete Openin		Net Ar	ea	U-valı	ue	AXU		k-value	9	AXk
3. Hea ELEM			SS	oaramete Openin m	gs	Net Ar A ,r		U-valı W/m2		A X U (W/		k-value kJ/m²-l		A X k kJ/K
ELEM		Gros area	SS	Openin	gs		n²		K.					
ELEM Windov	IENT	Gros area e 1	SS	Openin	gs	A ,r	m²	W/m2	K 0.04] =	(W/				kJ/K
ELEM Windov Windov	IENT ws Type	Gros area e 1 e 2	SS	Openin	gs	A ,r 4.39	n ² x ^{1,}	W/m2 /[1/(1.4)+	K 0.04] = 0.04] =	(W/ 5.82				kJ/K (27)
ELEM Windov Windov Windov	IENT ws Type ws Type	Gros area area a 1 a 2 a 3	SS	Openin	gs	A ,r 4.39 6.71	n ² x ^{1,} x ^{1,} x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+	2K 0.04] = 0.04] = 0.04] =	(W/ 5.82 8.9				kJ/K (27) (27)
ELEM Windov Windov Windov Windov	IENT ws Type ws Type ws Type	Gros area e 1 e 2 e 3 e 4	SS	Openin	gs	A ,n 4.39 6.71 2.09	n ² x ¹ / x ¹ / x ¹ / x ¹ / x ¹ /	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	<pre>K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =</pre>	(W/ 5.82 8.9 2.77				kJ/K (27) (27) (27)
ELEM Windov Windov Windov Windov Windov	IENT ws Type ws Type ws Type ws Type	Gros area 9 1 9 2 9 3 9 4 9 5	SS	Openin	gs	A ,r 4.39 6.71 2.09 2.09	n ² x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] =	(W/) 5.82 8.9 2.77 2.77				kJ/K (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov	IENT ws Type ws Type ws Type ws Type	Gros area 2 1 2 2 3 3 2 4 2 5 2 6	SS	Openin	gs	A ,r 4.39 6.71 2.09 2.09 2.09	n ² x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W// 5.82 8.9 2.77 2.77 2.77				kJ/K (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov	IENT ws Type ws Type ws Type ws Type ws Type	Gros area 2 2 3 4 4 5 5 6 6 7	SS	Openin	gs	A ,r 4.39 6.71 2.09 2.09 2.09 2.09	n ² x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	(W// 5.82 8.9 2.77 2.77 2.77 2.77				kJ/K (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov	IENT ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 2 2 3 4 5 5 6 7 8 8	SS	Openin	gs	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 0.57	n ² x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76				kJ/K (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 2 2 3 4 5 5 6 7 8 8	SS	Openin	gs	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 0.57 1.05	n ² x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,} x ^{1,}	W/m2 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov Windov	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 2 2 3 4 5 5 6 7 8 8	ss (m²)	Openin	gs 2	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 0.57 1.05 2.83	n ² x1, x1, x1, x1, x1, x1, x1, x1,	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} K \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39 3.75	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov Windov Rooflig	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type hts	Gros area 2 2 3 4 5 6 7 8 8 9	2	Openin	gs 2	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 0.57 1.05 2.83 10.5299	$ \begin{array}{c} n^{2} \\ x^{1} $	W/m2 /[1/(1.4)+ /[1/(1.4)+	$\begin{array}{c} 0.04\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ 0.04\\ =\\ \end{array}$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39 3.75 17.9002	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov Windov Rooflig Walls Roof T	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type hts	Gros area 2 3 4 5 6 7 8 9 147.	2 3 3	Openin m	gs 1	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 0.57 1.05 2.83 10.529 123.29	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	W/m2 /[1/(1.4)+ /[1/(1.7) + 0.18	$\begin{array}{c} 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39 3.75 17.9002 22.19	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov Windov Rooflig Walls Roof T Roof T	IENT ws Type ws Type ws Type ws Type ws Type ws Type hts	Gros area 2 2 3 4 5 6 7 8 9 147. 9.4	2 2 37	Openin m 23.9	gs 1	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 2.09 0.57 1.05 2.83 10.529 123.24 9.48	n ² x1, x1, x1, x1, x1, x1, x1, x1, x1, x1,	W/m2 /[1/(1.4)+ /[1/(1.7)+ 0.18 0.13	$\begin{array}{c} 0.04] = \\$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39 3.75 17.9002 22.19 1.23	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov Windov Rooflig Walls Roof T Roof T	IENT ws Type ws Type ws Type ws Type ws Type ws Type hts - ype1 - ype2 rea of e	Gros area 2 2 3 4 5 6 7 8 9 147. 9.44 71.6	2 2 37	Openin m 23.9	gs 1	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 2.09 0.57 1.05 2.83 10.529 123.29 9.48 61.14 228.33	n ² x1, x1, x1, x1, x1, x1, x1, x1,	W/m2 /[1/(1.4)+ /[1/(1.7) + 0.18 0.13	$\begin{array}{c} 0.04] = \\$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39 3.75 17.9002 22.19 1.23 7.95	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEM Windov Windov Windov Windov Windov Windov Windov Rooflig Walls Roof T Roof T Roof T	IENT ws Type ws Type ws Type ws Type ws Type ws Type ws Type hts Type1 Type2 rea of e vall	Gros area 2 2 3 4 5 6 7 8 9 147. 9.44 71.6	2 2 37	Openin m 23.9	gs 1	A ,r 4.39 6.71 2.09 2.09 2.09 2.09 0.57 1.05 2.83 10.529 123.29 9.48 61.14	$ \begin{array}{c} n^{2} \\ x^{1} $	W/m2 /[1/(1.4)+ /[1/(1.7)+ 0.18 0.13	$\begin{array}{c} K \\ 0.04] = \\ 0.$	(W// 5.82 8.9 2.77 2.77 2.77 2.77 0.76 1.39 3.75 17.9002 22.19 1.23	ĸ)			kJ/K (27) (27) (27) (27) (27) (27) (27) (27)

* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in para ** include the areas on both sides of internal walls and partitions

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

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



i leat c	apacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	0	(34)
Therm	al mass	parame	ter (TMF	P = Cm -	÷ TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	(35)
	•	sments wh ad of a de			construct	ion are noi	t known pr	ecisely the	indicative	values of	TMP in Ta	able 1f		
Therm	al bridge	es : S (L	x Y) cal	culated	using Ap	pendix l	<						6.8	(36)
			are not kn	own (36) =	= 0.15 x (3	1)			(00)	(00)				
	abric he			الملامم معذاما						(36) =	'05)m v (5)		86.64	(37)
ventila		at loss ca				lun	11	A			25)m x (5)	_	1	
(38)m=	Jan 72.1	Feb 71.79	Mar 71.5	Apr 70.1	May 69.84	Jun 68.62	Jul 68.62	Aug 68.4	Sep 69.09	Oct 69.84	Nov 70.37	Dec 70.92		(38)
				70.1	00.04	00.02	00.02	00.4				10.52	1	(00)
	r		· · · ·	450.74	450.47	455.00	455.00	455.00		= (37) + (3	· ·	457.50	1	
(39)m=	158.73	158.43	158.13	156.74	156.47	155.26	155.26	155.03	155.73	156.47	157 Sum(39)1	157.56	156.73	(39)
Heat lo	oss para	ameter (H	HLP), W/	′m²K						= (39)m ÷		12 / 12=	150.75	(00)
(40)m=	1.15	1.15	1.15	1.14	1.14	1.13	1.13	1.13	1.13	1.14	1.14	1.14]	
Numbe	er of day	/s in moi	nth (Tab	le 1a)					,	Average =	Sum(40)1.	12 /12=	1.14	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
											•		-	
4. Wa	ater heat	ting enei	rgy requi	rement:								kWh/y	ear:	
if TF	A > 13.9	upancy, l 9, N = 1		[1 - exp	.(_0 0003	240 y /TE					2.	91]	(42)
		9. N = 1		li onp	(-0.0003	949 X (11	-A -13.9)2)] + 0.(0013 x (TFA -13.	.9)		-	
Reduce	l averag	al average	ater usag hot water	ge in litre	es per da 5% if the o vater use, I	ay Vd,av Iwelling is	erage = designed t	(25 x N)	+ 36		103	3.38]	(43)
Reduce	l averag the annua e that 125	ge hot wa al average i litres per j	ater usag hot water berson per	ge in litre usage by ⁻ day (all w	es per da 5% if the a vater use, l	ay Vd,av welling is not and co	erage = designed t ld)	(25 x N) to achieve	+ 36 a water us	se target o	10: f]	(43)
Reduce not more	l averag the annua e that 125 Jan	je hot wa al average litres per j Feb	ater usag hot water berson per Mar	ge in litre usage by day (all w Apr	es per da 5% if the a	ay Vd,av Iwelling is not and co Jun	erage = designed i ld) Jul	(25 x N) to achieve Aug	+ 36		103	3.38 Dec]	(43)
Reduce not more	l averag the annua e that 125 Jan	je hot wa al average litres per j Feb	ater usag hot water berson per Mar	ge in litre usage by day (all w Apr	es per da 5% if the o vater use, I May	ay Vd,av Iwelling is not and co Jun	erage = designed i ld) Jul	(25 x N) to achieve Aug	+ 36 a water us	se target o	10: f]]	(43)
Reduce not more Hot wate (44)m=	l averag the annua e that 125 Jan er usage it 113.71	ge hot wa al average litres per p Feb n litres per 109.58	ater usag hot water person per Mar day for ea 105.44	ge in litre usage by day (all w Apr ach month 101.31	es per da 5% if the o vater use, I May Vd,m = fa	ay Vd,av welling is not and co Jun ctor from 7 93.04	erage = designed t ld) Jul Table 1c x 93.04	(25 x N) to achieve Aug (43) 97.17	+ 36 a water us Sep 101.31	oct Oct 105.44 Total = Su	103 109.58 m(44)112	Dec 113.71	1240.52	(43)
Reduce not more Hot wate (44)m=	l averag the annua e that 125 Jan er usage it 113.71	ge hot wa al average litres per p Feb n litres per 109.58	ater usag hot water person per Mar day for ea 105.44	ge in litre usage by day (all w Apr ach month 101.31	es per da 5% if the o vater use, l May Vd,m = fa 97.17	ay Vd,av welling is not and co Jun ctor from 7 93.04	erage = designed t ld) Jul Table 1c x 93.04	(25 x N) to achieve Aug (43) 97.17	+ 36 a water us Sep 101.31	oct Oct 105.44 Total = Su	103 109.58 m(44)112	Dec 113.71	1240.52	
Reduce not more Hot wate (44)m= Energy	I averag the annua e that 125 Jan er usage in 113.71 content of	ge hot wa al average i litres per p Feb n litres per 109.58	ater usag hot water person per Mar day for ea 105.44 used - cal	ge in litre usage by day (all w Apr ach month 101.31	es per da 5% if the a vater use, l May Vd,m = fa 97.17 onthly = 4.	ay Vd,av Iwelling is not and co Jun ctor from 7 93.04 190 x Vd,r	erage = designed i ld) Table 1c x 93.04 m x nm x D	(25 x N) to achieve Aug (43) 97.17 DTm / 3600	+ 36 a water us Sep 101.31 0 kWh/mor 118.22	Oct Oct 105.44 Total = Su oth (see Ta 137.77	Nov 109.58 m(44)112 ables 1b, 1	Dec 113.71 c, 1d) 163.31	1240.52	
Reduce not more Hot wate (44)m= Energy (45)m=	l averag the annua e that 125 Jan er usage in 113.71 content of 168.63	e hot wa al average litres per j Feb n litres per 109.58 hot water 147.49	ater usag hot water person per Mar 105.44 used - cal 152.2	ge in litre usage by day (all w Apr ach month 101.31 culated mo 132.69	es per da 5% if the a vater use, l May Vd,m = fa 97.17 onthly = 4.	ay Vd,av Iwelling is not and co Jun ctor from T 93.04 190 x Vd,r 109.86	erage = designed i ld) Jul Table 1c x 93.04 $n \times nm \times D$ 101.81	(25 x N) to achieve Aug (43) 97.17 97.17 07m / 3600 116.82	+ 36 a water us Sep 101.31 0 kWh/mor 118.22	Oct Oct 105.44 Total = Su oth (see Ta 137.77	Nov 109.58 m(44) ₁₁₂ = ables 1b, 1 150.39	Dec 113.71 c, 1d) 163.31		(44)
Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m=	l averag the annua e that 125 Jan er usage in 113.71 content of 168.63	e hot wa al average litres per j Feb n litres per 109.58 hot water 147.49 vater heatin 22.12	ater usag hot water person per Mar 105.44 used - cal 152.2	ge in litre usage by day (all w Apr ach month 101.31 culated mo 132.69	es per da 5% if the a vater use, I May Vd,m = fa 97.17 onthly = 4. 127.32	ay Vd,av Iwelling is not and co Jun ctor from T 93.04 190 x Vd,r 109.86	erage = designed i ld) Jul Table 1c x 93.04 $n \times nm \times D$ 101.81	(25 x N) to achieve Aug (43) 97.17 97.17 07m / 3600 116.82	+ 36 a water us Sep 101.31 0 kWh/mor 118.22	Oct Oct 105.44 Total = Su oth (see Ta 137.77	Nov 109.58 m(44) ₁₁₂ = ables 1b, 1 150.39	Dec 113.71 c, 1d) 163.31		(44)
Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m= Water	I averag the annua e that 125 Jan er usage in 113.71 content of 168.63 taneous w 25.3 storage	e hot wa al average litres per Feb n litres per 109.58 hot water 147.49 vater heatii 22.12 loss:	ater usag hot water person per Mar day for ea 105.44 used - cal 152.2 ng at point 22.83	ge in litre usage by day (all w Apr ach month 101.31 culated mo 132.69 of use (no 19.9	es per da 5% if the o vater use, I May Vd,m = fa 97.17 onthly = 4. 127.32 o hot water	ay Vd,av welling is not and co Jun ctor from 1 93.04 190 x Vd,r 109.86 storage), 16.48	erage = designed to Id) Table 1c x 93.04 n x nm x D 101.81 enter 0 in 15.27	(25 x N) to achieve Aug (43) 97.17 97.17 07m / 3600 116.82 boxes (46) 17.52	+ 36 a water us Sep 101.31 b kWh/mor 118.22) to (61) 17.73	Oct 105.44 Total = Su 137.77 Total = Su 20.67	103 Nov 109.58 m(44)112 = ables 1b, 1 150.39 m(45)112 = 22.56	Dec 113.71 c, 1d) 163.31		(44)
Reduce not more (44)m= Energy (45)m= If instan (46)m= Water Storag If common	I averag the annua e that 125 Jan er usage in 113.71 content of 168.63 taneous w 25.3 storage storage ye volum munity h vise if no	ye hot wa al average i litres per j Feb n litres per 109.58 hot water 147.49 vater heatin 22.12 loss: ne (litres) neating a p stored	Ater usag hot water person per Mar day for ea 105.44 used - cal 152.2 ng at point 22.83 includin and no ta	ge in litre usage by day (all w Apr ach month 101.31 culated mo 132.69 of use (no 19.9 ng any so nk in dw	es per da 5% if the o vater use, I May Vd,m = fa 97.17 onthly = 4. 127.32 o hot water 19.1	ay Vd,av Iwelling is not and co Jun ctor from 7 93.04 190 x Vd,r 109.86 storage), 16.48 /WHRS nter 110	erage = designed i ld) Jul Table 1c x 93.04 $n \times nm \times D$ 101.81 enter 0 in 15.27 storage) litres in	(25 x N) to achieve Aug (43) 97.17	+ 36 a water us Sep 101.31 10 kWh/mor 118.22) to (61) 17.73 ame ves	Se target o Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	100 Nov 109.58 m(44)112 ables 1b, 1 150.39 m(45)112 22.56	Dec 113.71 c, 1d) 163.31 24.5		(44) (45) (46)
Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m= Water Storag If come Otherv Water	I averag the annua e that 125 Jan er usage in 113.71 content of 168.63 taneous w 25.3 storage ye volum munity h vise if no storage	e hot wa al average i litres per j Feb n litres per 109.58 hot water 147.49 vater heatil 22.12 loss: ne (litres) neating a p stored loss:	ater usag hot water person per Mar 105.44 used - cal 152.2 ng at point 22.83 includin and no ta hot wate	ge in litre usage by day (all w Apr ach month 101.31 culated me 132.69 of use (no 19.9 of use (no 19.9	es per da 5% if the o vater use, I May Vd,m = fa 97.17 onthly = 4. 127.32 o hot water 19.1 olar or W velling, e	ay Vd,av Iwelling is not and co Jun ctor from 7 93.04 190 x Vd,r 109.86 storage), 16.48 /WHRS nter 110 nstantar	erage = designed i ld) Jul Table 1c x 93.04 $n \times nm \times E$ 101.81 enter 0 in 15.27 storage litres in neous co	(25 x N) to achieve Aug (43) 97.17	+ 36 a water us Sep 101.31 10 kWh/mor 118.22) to (61) 17.73 ame ves	Se target o Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	109.58 m(44)112 ables 1b, 1 150.39 m(45)112 22.56 47)	Dec 113.71 c, 1d) 163.31 24.5		(44) (45) (46)
Reduce not more (44)m= Energy (45)m= If instan (46)m= Water Storag If common Otherw Water a) If m	I averag the annua e that 125 Jan er usage in 113.71 content of 168.63 taneous w 25.3 storage ye volum munity h vise if no storage nanufact	e hot wa al average i litres per j Feb n litres per 109.58 hot water 147.49 vater heatil 22.12 loss: ne (litres) neating a p stored loss:	ater usag hot water person per Mar 105.44 used - cal 152.2 ng at point 22.83 includin and no ta hot wate	ge in litre usage by day (all w Apr ach month 101.31 culated mo 132.69 of use (no 19.9 ag any so ank in dw er (this ir	es per da 5% if the o vater use, I May Vd,m = fa 97.17 onthly = 4. 127.32 o hot water 19.1 olar or W velling, e ncludes i	ay Vd,av Iwelling is not and co Jun ctor from 7 93.04 190 x Vd,r 109.86 storage), 16.48 /WHRS nter 110 nstantar	erage = designed i ld) Jul Table 1c x 93.04 $n \times nm \times E$ 101.81 enter 0 in 15.27 storage litres in neous co	(25 x N) to achieve Aug (43) 97.17	+ 36 a water us Sep 101.31 10 kWh/mor 118.22) to (61) 17.73 ame ves	Se target o Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	Nov 109.58 m(44) ₁₁₂ = ables 1b, 1 150.39 m(45) ₁₁₂ = 22.56 (Dec 113.71 <i>c, 1d)</i> 163.31 24.5 0		(44) (45) (46) (47)



		age loss neating s			le 2 (kW	h/litre/da	ay)					0	Ι	(51)
	•	from Ta		011 4.5								0		(52)
		actor fro		2h								0 0		(52) (53)
•								(47) (54)		50)		-		
		om water (54) in (5	-	e, KVVN/ye	ear			(47) x (51)) x (52) x (53) =		0		(54)
	. ,	. , .						((50))				0	ı.	(55)
water	storage	loss cal	culated	for each	month			((56)m = (55) × (41)r	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	0), 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	v circuit	loss (ar	inual) fro	om Table	e 3							0		(58)
	•	loss cal	,			59)m = ((58) ÷ 36	65 × (41)	m					
	•	factor fi				,	. ,	• •		r thermo	stat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss ca	lculated	for each	month	(61)m =	(60) ÷ 30	65 x (41))m						
(61)m=	50.96	46.03	50.96	49.32	49.52	45.88	47.41	49.52	49.32	50.96	49.32	50.96		(61)
Total h		l uired for	water h	L eating ca	I	l for eac	l h month	(62)m –	0.85 v ((45)m +	I (46)m +	(57)m +	(59)m + (61)m	
(62)m=	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		(62)
				_			_						,	(02)
		calculated								r contribut	ion to wate	er neating)		
•	r	l lines if		r	r	r	· ·	İ	,		-	-	l	(00)
(63)m=	0	0	0	0	0	0	0	0	0	0	0	0	I	(63)
Output	r	ater hea											1	
(64)m=	219.59	193.52	203.15	182	176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		-
								Outp	out from wa	ater heate	r (annual)₁	12	2216.65	(64)
Heat g	ains fro	m water	heating,	, kWh/m	onth 0.2	5 ´ [0.85	× (45)m	ı + (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)m]	
(65)m=	68.81	60.55	63.34	56.45	54.71	48	45.7	51.22	51.64	58.55	62.33	67.04		(65)
inclu	ide (57)	m in calo	culation	of (65)m	only if c	ylinder i	s in the o	dwelling	or hot w	ater is fr	om com	munity h	eating	
5. Int	ternal da	ains (see	Table 5	5 and 5a):									
		is (Table			,									
Melab	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m=	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63		(66)
		(calcula												
(67)m=	27.36	24.3	19.76	14.96	11.18	9.44	10.2	13.26	17.8	22.6	26.37	28.12		(67)
											20.37	20.12	1	(07)
••		ins (calc		<u> </u>	· ·	r	r	,.		·	i	i	1	()
(68)m=	306.85	310.03	302.01	284.93	263.37	243.1	229.56	226.38	234.4	251.48	273.05	293.31	I	(68)
Cookir	ng gains	(calcula	ted in A	ppendix	L, equat	tion L15	or L15a)), also se	e Table	5	-			
(69)m=	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56		(69)
Pumps	s and fai	ns gains	(Table §	5a)										
(70)m=	3	3	3	3	3	3	3	3	3	3	3	3		(70)
Losses	s e.g. ev	vaporatio	n (nega	tive valu	es) (Tab	ole 5)								
(71)m=	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51		(71)
Water	heating	gains (T	able 5)	•	•			•			•			
(72)m=	92.49	90.1	85.14	78.4	73.54	66.67	61.43	68.85	71.72	78.7	86.57	90.11		(72)
	L	I		I	I	I	I				I		i	





Total internal gains =					(66)n	n + (67)m	+ (68	3)m + ((69)m + (7	70)m +	(71)m + (72)	m		
(73)m= 496.38 494.12	476.6	447.98	417.78	38	88.9	370.88	378.	.18	393.61	422.47	7 455.68	481.23]	(73)
6. Solar gains:												-		
Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.														
Orientation: Access Fa	actor	Area			Flux				g_ ble 6b		FF		Gains	
Table 6d		m²		-	Tab	le 6a		Ta		_	Table 6c		(W)	_
Northeast 0.9x 0.77	×	2.0)9	×	11	.28	x		0.63	×	0.7	=	7.21	(75)
Northeast 0.9x 0.77	×	2.0)9	×	11	.28	x		0.63	×	0.7	=	7.21	(75)
Northeast 0.9x 0.77	×	2.0)9	×	11	.28	x		0.63	×	0.7	=	7.21	(75)
Northeast 0.9x 0.77	x	2.0)9	×	11	.28	x		0.63	×	0.7	=	7.21	(75)
Northeast 0.9x 0.77	x	2.0)9	×	22	2.97	x		0.63	×	0.7	=	14.67	(75)
Northeast 0.9x 0.77	x	2.0)9	×	22	2.97	x		0.63	×	0.7	=	14.67	(75)
Northeast 0.9x 0.77	×	2.0)9	×	22	2.97	x		0.63	×	0.7	=	14.67	(75)
Northeast 0.9x 0.77	x	2.0)9	×	22	2.97	x		0.63	×	0.7	=	14.67	(75)
Northeast 0.9x 0.77	x	2.0)9	×	41	.38	x		0.63	×	0.7	=	26.43	(75)
Northeast 0.9x 0.77	x	2.0)9	×	41	.38	x		0.63	×	0.7	=	26.43	(75)
Northeast 0.9x 0.77	x	2.0)9	×	41	.38	x		0.63	×	0.7	=	26.43	(75)
Northeast 0.9x 0.77	x	2.0)9	×	41	.38	x		0.63	x	0.7	=	26.43	(75)
Northeast 0.9x 0.77	x	2.0)9	×	67	.96	x		0.63	x	0.7	=	43.41	(75)
Northeast 0.9x 0.77	x	2.0)9	× [67	.96	x		0.63	x	0.7	=	43.41	(75)
Northeast 0.9x 0.77	x	2.0)9	×	67	.96	x		0.63	x	0.7	=	43.41	(75)
Northeast 0.9x 0.77	x	2.0)9	× [67	.96	x		0.63	×	0.7	=	43.41	(75)
Northeast 0.9x 0.77	x	2.0)9	×	91	.35	x		0.63	×	0.7	=	58.35	(75)
Northeast 0.9x 0.77	x	2.0)9	×	91	.35	x		0.63	x	0.7	=	58.35	(75)
Northeast 0.9x 0.77	x	2.0)9	× [91	.35	x		0.63	×	0.7	=	58.35	(75)
Northeast 0.9x 0.77	x	2.0)9	×	91	.35	x		0.63	×	0.7	=	58.35	(75)
Northeast 0.9x 0.77	x	2.0)9	×	97	.38	x		0.63	×	0.7	=	62.2	(75)
Northeast 0.9x 0.77	x	2.0)9	×	97	.38	x		0.63	×	0.7	=	62.2	(75)
Northeast 0.9x 0.77	x	2.0)9	× [97	.38	x		0.63	×	0.7	=	62.2	(75)
Northeast 0.9x 0.77	x	2.0)9	×	97	.38	x		0.63	×	0.7	=	62.2	(75)
Northeast 0.9x 0.77	x	2.0)9	×	9	1.1	x		0.63	×	0.7	=	58.19	(75)
Northeast 0.9x 0.77	x	2.0)9	× [9	1.1	x		0.63	x	0.7	=	58.19	(75)
Northeast 0.9x 0.77	x	2.0)9	×	9	1.1	x		0.63	x	0.7	=	58.19	(75)
Northeast 0.9x 0.77	x	2.0)9	× [9	1.1	x		0.63	x	0.7	=	58.19	(75)
Northeast 0.9x 0.77	x	2.0)9	× [72	2.63	x		0.63	×	0.7	=	46.39	(75)
Northeast 0.9x 0.77	x	2.0)9	x [72	2.63	x		0.63	x	0.7	=	46.39	(75)
Northeast 0.9x 0.77	x	2.0)9	× [72	2.63	x		0.63	x	0.7	=	46.39	(75)
Northeast 0.9x 0.77	x	2.0)9	× [72	2.63	x		0.63	x	0.7	=	46.39	(75)
Northeast 0.9x 0.77	x	2.0)9	x [50).42	x		0.63	x	0.7	=	32.21	(75)
Northeast 0.9x 0.77	x	2.0)9	×	50	.42	x		0.63	×	0.7	=	32.21	(75)

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Northeast 0.9x	0.77	x	2.09	×	50.42	×	0.63	x	0.7] =	32.21	(75)
Northeast 0.9x	0.77] x	2.09	x	50.42	x	0.63	x	0.7	=	32.21	(75)
Northeast 0.9x	0.77	x	2.09	x	28.07	×	0.63	x	0.7	1 =	17.93	(75)
Northeast 0.9x	0.77	x	2.09	x	28.07	×	0.63	x	0.7	=	17.93	(75)
Northeast 0.9x	0.77	x	2.09	x	28.07	×	0.63	x	0.7	=	17.93	(75)
Northeast 0.9x	0.77	x	2.09	x	28.07	x	0.63	x	0.7	i =	17.93	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	×	0.63	x	0.7	i =	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	×	0.63	x	0.7	i =	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	×	0.63	x	0.7] =	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	×	0.63	x	0.7] =	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	9.21	×	0.63	x	0.7] =	5.89	(75)
Northeast 0.9x	0.77	x	2.09	x	9.21	x	0.63	x	0.7	=	5.89	(75)
Northeast 0.9x	0.77	x	2.09	x	9.21	x	0.63	x	0.7	=	5.89	(75)
Northeast 0.9x	0.77	x	2.09	×	9.21	×	0.63	x	0.7	=	5.89	(75)
Southwest _{0.9x}	0.77	x	4.39	x	36.79		0.63	x	0.7	=	49.36	(79)
Southwest _{0.9x}	0.77	x	6.71	x	36.79]	0.63	x	0.7	=	75.45	(79)
Southwest _{0.9x}	0.77	x	2.83	x	36.79		0.63	x	0.7	=	31.82	(79)
Southwest _{0.9x}	0.77	x	4.39	x	62.67		0.63	x	0.7	=	84.09	(79)
Southwest _{0.9x}	0.77	x	6.71	x	62.67		0.63	x	0.7	=	128.52	(79)
Southwest _{0.9x}	0.77	x	2.83	x	62.67		0.63	x	0.7	=	54.21	(79)
Southwest _{0.9x}	0.77	x	4.39	x	85.75		0.63	x	0.7	=	115.05	(79)
Southwest _{0.9x}	0.77	x	6.71	x	85.75		0.63	x	0.7	=	175.85	(79)
Southwest _{0.9x}	0.77	x	2.83	x	85.75		0.63	x	0.7	=	74.17	(79)
Southwest _{0.9x}	0.77	x	4.39	x	106.25		0.63	x	0.7	=	142.55	(79)
Southwest _{0.9x}	0.77	x	6.71	x	106.25		0.63	x	0.7	=	217.89	(79)
Southwest _{0.9x}	0.77	x	2.83	x	106.25		0.63	x	0.7	=	91.9	(79)
Southwest _{0.9x}	0.77	x	4.39	x	119.01		0.63	x	0.7	=	159.67	(79)
Southwest _{0.9x}	0.77	x	6.71	×	119.01	ļ	0.63	x	0.7	=	244.05	(79)
Southwest _{0.9x}	0.77	x	2.83	×	119.01		0.63	x	0.7	=	102.93	(79)
Southwest0.9x	0.77	×	4.39	X	118.15		0.63	x	0.7	=	158.51	(79)
Southwest _{0.9x}	0.77	x	6.71	X	118.15		0.63	x	0.7	=	242.29	(79)
Southwest _{0.9x}	0.77	X	2.83	X	118.15		0.63	X	0.7	=	102.19	(79)
Southwest _{0.9x}	0.77	X	4.39	X	113.91		0.63	X	0.7] =	152.83	(79)
Southwesto.9x	0.77	×	6.71	X	113.91		0.63	X	0.7] =	233.59	(79)
Southwest _{0.9x}	0.77	X	2.83	X	113.91		0.63	X	0.7] =	98.52	(79)
Southwesto.9x	0.77	×	4.39	X	104.39]	0.63	x	0.7] =	140.05	(79)
Southwesto.9x	0.77	X	6.71	×	104.39	 1	0.63	x	0.7] =	214.07	(79)
Southwest _{0.9x}	0.77	×	2.83	×	104.39] 1	0.63	x	0.7] =	90.29	(79)
Southwesto or	0.77	X	4.39	×	92.85	 1	0.63	x	0.7] =	124.57	(79)
Southwest _{0.9x}	0.77	X	6.71	x	92.85	 	0.63	x	0.7] =	190.41	(79)
	0.77	x	2.83	X	92.85	I	0.63	X	0.7	=	80.31	(79)



Southwest0.9x	0.77	x	4.39	×	69.27		0.63	x	0.7	=	92.93	(79)
Southwest _{0.9x}	0.77	x	6.71	×	69.27		0.63	x	0.7	=	142.04	(79)
Southwest _{0.9x}	0.77	×	2.83	×	69.27		0.63	x	0.7	=	59.91	(79)
Southwest _{0.9x}	0.77	x	4.39	×	44.07		0.63	x	0.7	=	59.13	(79)
Southwest _{0.9x}	0.77	x	6.71	×	44.07		0.63	x	0.7	=	90.37	(79)
Southwest _{0.9x}	0.77	x	2.83	x	44.07	İ	0.63	x	0.7	=	38.12	(79)
Southwest0.9x	0.77	x	4.39	×	31.49		0.63	x	0.7	=	42.25	(79)
Southwest _{0.9x}	0.77	×	6.71	×	31.49		0.63	x	0.7	=	64.57	(79)
Southwest0.9x	0.77	x	2.83	×	31.49		0.63	x	0.7	=	27.23	(79)
Northwest 0.9x	0.77	x	0.57	×	11.28	x	0.63	x	0.7	=	1.97	(81)
Northwest 0.9x	0.77	×	1.05	×	11.28	x	0.63	x	0.7	=	3.62	(81)
Northwest 0.9x	0.77	x	0.57	x	22.97	x	0.63	x	0.7	=	4	(81)
Northwest 0.9x	0.77	×	1.05	×	22.97	x	0.63	x	0.7	=	7.37	(81)
Northwest 0.9x	0.77	×	0.57	×	41.38	x	0.63	x	0.7	=	7.21	(81)
Northwest 0.9x	0.77	×	1.05	×	41.38	x	0.63	x	0.7	=	13.28	(81)
Northwest 0.9x	0.77	×	0.57	×	67.96	x	0.63	x	0.7	=	11.84	(81)
Northwest 0.9x	0.77	x	1.05	×	67.96	x	0.63	x	0.7	=	21.81	(81)
Northwest 0.9x	0.77	x	0.57	×	91.35	x	0.63	x	0.7	=	15.91	(81)
Northwest 0.9x	0.77	x	1.05	×	91.35	x	0.63	x	0.7	=	29.31	(81)
Northwest 0.9x	0.77	x	0.57	x	97.38	x	0.63	x	0.7	=	16.96	(81)
Northwest 0.9x	0.77	x	1.05	×	97.38	x	0.63	x	0.7	=	31.25	(81)
Northwest 0.9x	0.77	x	0.57	×	91.1	x	0.63	x	0.7	=	15.87	(81)
Northwest 0.9x	0.77	x	1.05	x	91.1	x	0.63	x	0.7	=	29.23	(81)
Northwest 0.9x	0.77	x	0.57	×	72.63	x	0.63	x	0.7	=	12.65	(81)
Northwest 0.9x	0.77	x	1.05	x	72.63	x	0.63	x	0.7	=	23.31	(81)
Northwest 0.9x	0.77	x	0.57	×	50.42	x	0.63	x	0.7	=	8.78	(81)
Northwest 0.9x	0.77	×	1.05	×	50.42	x	0.63	x	0.7	=	16.18	(81)
Northwest 0.9x	0.77	×	0.57	×	28.07	x	0.63	x	0.7	=	4.89	(81)
Northwest 0.9x	0.77	X	1.05	×	28.07	x	0.63	x	0.7	=	9.01	(81)
Northwest 0.9x	0.77	X	0.57	×	14.2	x	0.63	X	0.7	=	2.47	(81)
Northwest 0.9x	0.77	x	1.05	x	14.2	x	0.63	x	0.7	=	4.56	(81)
Northwest 0.9x	0.77	X	0.57	×	9.21	x	0.63	X	0.7	=	1.61	(81)
Northwest 0.9x	0.77	X	1.05	×	9.21	x	0.63	X	0.7	=	2.96	(81)
Rooflights 0.9x	1	×	10.53	×	20.24	x	0.63	X	0.7	=	84.57	(82)
Rooflights 0.9x	1	X	10.53	×	40.55	X	0.63	X	0.7	=	169.45	(82)
Rooflights 0.9x	1	×	10.53	×	74.78	x	0.63	X	0.7	=	312.52	(82)
Rooflights 0.9x	1	×	10.53	×	130.19	x	0.63	x	0.7	=	544.08	(82)
Rooflights 0.9x	1	X	10.53	×	183.82	x	0.63	x	0.7	=	768.22	(82)
Rooflights 0.9x	1	×	10.53	×	200.21	x	0.63	x	0.7	=	836.7	(82)
Rooflights 0.9x	1	×	10.53	×	185.57	x	0.63	x	0.7	=	775.55	(82)
Rooflights 0.9x	1	×	10.53	×	142.19	x	0.63	×	0.7	=	594.24	(82)



Rooflights 0.9x	1	×	10.	53	x [9	3.09	× [0.63	ר × [0.7	=	389.03	(82)
Rooflights 0.9x	1	x	10.		x [9.71	」 」 [0.63		0.7	=	207.75	(82)
Rooflights 0.9x	1	×	10.		x [5.27	」 」 x [0.63	L x [0.7		105.6	(82)
Rooflights 0.9x	1	x	10.		× [6.69	x [0.63	L 	0.7		69.77	(82)
		^	10.	55	^ [I	0.09] ^ L		0.05		0.7		09.17	
Solar gains in watts, calculated for each month $(83)m = Sum(74)m \dots (82)m$															
(83)m= 275.63	506.31	803.79		1553.48	Ĩ –	36.71	1538.34	<u> </u>	-	938.1	588.24	336.52	231.92	1	(83)
Total gains – i	nternal a	ind sola	. (84)m =	- = (73)m ·	ــــــ + (٤	33)m	, watts					1	<u> </u>	1	
(84)m= 772.01	1000.43	1280.4	1651.65	1971.25	20	25.61	1909.22	1638	.34	1331.71	1010.7	792.2	713.15]	(84)
7. Mean internal temperature (heating season)															
Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85)															
Utilisation fac	tor for g	ains for	living are	ea, h1,m	ı (se	ее Та	ble 9a)								
Jan	Feb	Mar	Apr	May		Jun	Jul	Au	ıg	Sep	Oct	Nov	Dec]	
(86)m= 1	0.99	0.98	0.89	0.69	C).48	0.36	0.43	3	0.74	0.96	1	1		(86)
Mean interna	l temper	ature in	living ar	ea T1 (fo	ollo	w ste	ps 3 to 7	r in Ta	able	9c)			-	-	
(87)m= 19.72	19.94	20.29	20.71	20.93	1	0.99	21	21	-	20.93	20.55	20.05	19.68]	(87)
Temperature	during h	eating r	eriods ir	n rest of	dw	elling	from Ta	hle 9	Th	2 (°C)				1	
(88)m= 19.96	19.96	19.96	19.97	19.97	1	9.98	19.98	19.9	_	19.98	19.97	19.97	19.97	1	(88)
				walling	L			(]	
Utilisation fac	0.99	0.97	0.86	0.63		m (se).41	0.27	9a) 0.34	4	0.65	0.95	0.99	1	1	(89)
												0.00]	(00)
Mean interna	<u> </u>		1		Ť		[r –			,	10.74	40.40	1	(00)
(90)m= 18.25	18.57	19.07	19.65	19.91		9.97	19.98	19.9	.8	19.93	19.46	18.74 ng area ÷ (18.19		(90) (91)
													-,-	0.47	(91)
Mean interna	· · ·		i		<u> </u>								<u> </u>	1	(22)
(92)m= 18.93	19.21	19.64	20.14	20.39		0.45	20.45	20.4		20.4	19.97	19.35	18.89]	(92)
Apply adjustr	1		1		1			I	1	1		10.05	40.00	1	(93)
(93)m= 18.93	19.21	19.64	20.14	20.39	2	0.45	20.45	20.4	-5	20.4	19.97	19.35	18.89	l	(93)
8. Space hea				re obtair	hed	at ste	on 11 of	Table	a Qh	so that	Ti m–	(76)m an	d re-cal	culate	
the utilisation					ieu	ai 310	50 11 01	Table	5 30	, 30 เทลเ		(70)11 an	u ie-cai	Julate	
Jan	Feb	Mar	Apr	May		Jun	Jul	Αι	ıg	Sep	Oct	Nov	Dec]	
Utilisation fac	tor for g	ains, hm	:									_		_	
(94)m= 1	0.99	0.96	0.86	0.65	C).44	0.31	0.3	В	0.69	0.95	0.99	1		(94)
Useful gains,		W = (94	4)m x (8-	4)m	-							-		7	
(95)m= 769.96	991.2		1421.98			99.45	597.16	625.	37	916.32	957.67	786.95	711.85		(95)
Monthly aver	<u> </u>		i i i i i i i i i i i i i i i i i i i		1			i					 	1	
(96)m= 4.3	4.9	6.5	8.9	11.7		4.6	16.6	16.4		14.1	10.6	7.1	4.2]	(96)
Heat loss rate	1				-			- · ·	·	ī		4000.0	0040.00	1	(07)
	2266.67		1761.69)7.82 /mont	598.25	628.			1466.2		2313.83]	(97)
Space heatin (98)m= 1155.16	g require 857.12	626.97	r each n 244.59	10nth, KV 53.2	vvn/ T	/mont 0	n = 0.02	24 X [((97) 	m – (95) 0	m] x (4 378.39	- <u></u>	1191.87	1	
(00)11- 1100.10	007.12	020.31	277.03	00.2	I	0			Fotal			ar) = Sum(9)		5325.1	(98)
Space beatin	a roquire	amont in	k\//h/~?	Wear								,(,	[
Space heatin	grequite			year										38.65	(99)



9a. En	ergy rec	luiremen	nts – Ind	ividual h	eating sy	/stems i	ncluding	micro-C	HP)					
•	e heatir	•												-
	•			econdar		mentary	-						0	(201)
	-			nain syst				(202) = 1 -					1	(202)
			-	main sys				(204) = (2	02) × [1 –	(203)] =			1	(204)
				ing syste									93.4	(206)
Efficie	ency of s	seconda	ry/suppl	ementar	y heating	g system	ı, %						0	(208)
	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec pace heating requirement (calculated above)											kWh/yea	ar	
Space		· ·	· · ·	244.59		0	0	0	0	378.39	817.81	1101 07	l	
(011)-	1155.16		626.97		53.2	0	0	0	0	378.39	017.01	1191.87		(014)
(211)m	$1 = \{[(98) \\ 1236.78]$)m x (20 917.68	4)] } X 1 671.28	100 ÷ (20 261.87	56.96	0	0	0	0	405.13	875.6	1276.1		(211)
	1200.70	517.00	071.20	201.07	50.50	0	0	-	-	ar) = Sum(2)			5701.4	(211)
Space	e heatin	a fuel (se	econdar	y), kWh/	month					, , ,	715,1012		0101.1	
•)1)]}x1		• ·										
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		
								Tota	l (kWh/yea	ar) =Sum(2	2 15) _{15,1012}	Ē	0	(215)
	heating													
Output	from wa 219.59	ater hea 193.52	ter (calc 203.15	ulated a	00VE) 176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27		
Efficier		ater hea		102	170.04	100.70	140.22	100.04	107.00	100.70	100.71	214.27	80.3	(216)
(217)m=	-	88.35	87.7	85.8	82.43	80.3	80.3	80.3	80.3	86.77	88.22	88.7		(217)
Fuel fo	r water	heating,	kWh/m	onth										
. ,	1 = (64) 247.79	m x 100 219.03			214.53	193.96	185.83	207.15	208.64	217.51	226.37	044 57		
(219)11=	247.79	219.03	231.65	212.13	214.00	193.96	100.00		208.64 I = Sum(2 [*]		220.37	241.57	2606.15	(219)
Δnnua	l totals										Wh/year	.	kWh/year	(219)
		fuel use	ed, main	system	1						, your		5701.4	7
Water	heating	fuel use	d										2606.15	Ī
Electric	city for p	oumps, fa	ans and	electric	keep-ho	t								
centra	al heatin	g pump:										30		(230c)
		an-assis										45		(230e)
				kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
	city for li		abovo, 1						· · ·	(0)			483.11	(232)
	-		Individ	ual heat	ing over	ma inalı	Iding mi	oro CUD					403.11	
12a. V	JOZ em	15510115 -		luai neat	ing syste									
							ergy /h/year			Emiss kg CO2	ion fac 2/kWh	tor	Emissions kg CO2/yea	
Space	heating	(main s	ystem 1)		(211	l) x			0.2	16	=	1231.5	(261)
Space	heating	(second	dary)			(215	5) x			0.5	19	=	0	(263)
Water	heating					(219	9) x			0.2	16	=	562.93	(264)
-								261) + (262) + (263) + (264) =						(265)



Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93	(267)
Electricity for lighting	(232) x	0.519 =	250.74	(268)
Total CO2, kg/year		sum of (265)(271) =	2084.09	(272)
TER =			15.13	(273)