build energy

				User D	etails:						
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	
			P	roperty	Address	: Unit 1 (GF&FF	END) CI	LEAN		
Address :	New Dwellin	ng at:, Go	ordon He	ouse, 6	Lissende	en Garde	ens, LOI	NDON, N	W5 1LX	< Comparison of the second sec	
1. Overall dwelling dime	nsions:										
				Area	a(m²)	1	Av. He	ight(m)		Volume(m ³)	_
Ground floor				7	3.62	(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)+(1n) 1	37.76	(4)					
Dwelling volume						(3a)+(3b))+(3c)+(3d	d)+(3e)+	.(3n) =	389.63	(5)
2. Ventilation rate:											
	main heating		econdar eating	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 2	20 =	0	(6b)
Number of intermittent far	าร					- F	2	x 1	0 =	20	(7a)
Number of passive vents						Ē	0	x 1	0 =	0	(7b)
Number of flueless gas fir	res					Г	0	x 4	40 =	0	(7c)
									Air ch	anges per ho	ur
Infiltration due to chimney							20		÷ (5) =	0.05	(8)
If a pressurisation test has be Number of storeys in th			ed, proceed	d to (17),	otherwise (continue fr	om (9) to ((16)			
Additional infiltration	ie uwennig (na	<i>)</i>						[(9)-	1]x0.1 =	0	(9) (10)
Structural infiltration: 0.	25 for steel or	timber f	rame or	0.35 fo	r masoni	rv constr	uction	[(0)	1110.1 -	0	(11)
if both types of wall are pr						•				Ŭ	
deducting areas of openin			ad) or 0	1 (000)	ad) alaa	optor 0					
If suspended wooden fl If no draught lobby, ent			ea) or 0.	r (seale	eu), eise	enter U				0	(12)
Percentage of windows			rinned							0	(13)
Window infiltration		augnt Sti	nppeu		0.25 - [0.2	x (14) ÷ 1	001 =			0	(14)
Infiltration rate					(8) + (10)			+ (15) =		0	(15) (16)
Air permeability value,	a50 expresse	d in cub	ic metre	s ner hr					area	0	(17)
If based on air permeabili				•	•	•		intelepe	aroa	4 0.25	(18)
Air permeability value applies							is being u	sed		0.25	
Number of sides sheltere	d									3	(19)
Shelter factor					(20) = 1 -	[0.075 x (1	9)] =			0.78	(20)
Infiltration rate incorporati	ing shelter fac	tor			(21) = (18) x (20) =				0.19	(21)
Infiltration rate modified for	or monthly win	d speed									
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		



Wind Factor (22a)m = $(22)m \div 4$									
(22a)m= 1.27 1.25 1.23 1.1 1.0	0.95	0.95	0.92	1	1.08	1.12	1.18		
Adjusted infiltration rate (allowing for shelter	r and wind s	peed) =	(21a) x	(22a)m					
		0.19	0.18	0.19	0.21	0.22	0.23		
Calculate effective air change rate for the a If mechanical ventilation:	рріїсаріе са	se						0	(23a)
If exhaust air heat pump using Appendix N, (23b) =	(23a) × Fmv (e	equation (N	N5)) , othei	rwise (23b) = (23a)			0	(23b)
If balanced with heat recovery: efficiency in % allow	ing for in-use f	actor (from	n Table 4h)) =				0	(23c)
a) If balanced mechanical ventilation with	heat recove	ery (MV⊦	HR) (24a	a)m = (22	2b)m + (23b) × [1 – (23c)	÷ 100]	
(24a)m= 0 0 0 0 0	0	0	0	0	0	0	0		(24a)
b) If balanced mechanical ventilation with	out heat rec	overy (N	/IV) (24b)m = (22	2b)m + (23b)	-		
(24b)m= 0 0 0 0 0	0	0	0	0	0	0	0		(24b)
c) If whole house extract ventilation or po if $(22b)m < 0.5 \times (23b)$, then $(24c) = (24c)$	•				.5 × (23t))			
(24c)m= 0 0 0 0 0	0	0	0	0	0	0	0		(24c)
d) If natural ventilation or whole house po if (22b)m = 1, then (24d)m = (22b)m of					0.5]		·		
(24d)m= 0.53 0.53 0.53 0.52 0.5	62 0.52	0.52	0.52	0.52	0.52	0.52	0.53		(24d)
Effective air change rate - enter (24a) or ((24b) or (24	c) or (24	d) in boy	(25)					
(25)m= 0.53 0.53 0.53 0.52 0.5	62 0.52	0.52	0.52	0.52	0.52	0.52	0.53		(25)
3. Heat losses and heat loss parameter:									
3. Heat losses and heat loss parameter:ELEMENTGross area (m²)Openings m²	Net Ar A ,r		U-valı W/m2		A X U (W/	K)	k-value kJ/m²·ł		A X k kJ/K
ELEMENT Gross Openings		n²		K		K)			
ELEMENT Gross Openings area (m ²) m ²	A ,r	m ² x ^{1/}	W/m2	K 0.04] =	(W/	K)			kJ/K
ELEMENT Gross Openings area (m²) m² Windows Type 1	A ,r 5.31	m ² x ^{1/}	W/m2 /[1/(1.4)+	K 0.04] = 0.04] =	(W/ 7.04	K)			kJ/K (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2	A ,r 5.31 8.12	m ² x1/ x1/ x1/ x1/	W/m2 /[1/(1.4)+ /[1/(1.4)+	K 0.04] = 0.04] = 0.04] =	(W/ 7.04 10.77	K)			kJ/K (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3	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	K)			kJ/K (27) (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 4	A ,r 5.31 8.12 2.53 2.53	n ² 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)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 4Windows Type 5Gross	A ,r 5.31 8.12 2.53 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)+ (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	K)			kJ/K (27) (27) (27) (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 6	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)+	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 3.35	K)			kJ/K (27) (27) (27) (27) (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 6Windows Type 7Windows Type 7	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 $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$	(W/ 7.04 10.77 3.35 3.35 3.35 3.35 0.91	K)			kJ/K (27) (27) (27) (27) (27) (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 4Windows Type 4Yindows Type 5Windows Type 6Windows Type 7Windows Type 8Yindows Type 8	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 $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$	(W/ 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)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 6Windows Type 7Windows Type 8Windows Type 9	A ,r 5.31 8.12 2.53 2.53 2.53 2.53 2.53 0.69 1.27 3.42	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)+ (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/ 7.04 10.77 3.35 3.35 3.35 3.35 0.91 1.68 4.53				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 6Windows Type 7Windows Type 8Windows Type 9Rooflights	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/	W/m2 (1/(1.4)+ (1/(1.4)+	K $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$	(W/ 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)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 5Windows Type 6Windows Type 7Windows Type 8Windows Type 9RooflightsWalls147.228.93	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/ x1/ x1/ x1/ x1/ x1/ x1/ x1/	W/m2 (1/(1.4)+ (1/(1.4)+)	K $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$ $0.04] =$	(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				kJ/K (27) (27) (27) (27) (27) (27) (27) (27)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 6Windows Type 7Windows Type 8Windows Type 9RooflightsWalls147.2Roof Type 19.480	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 9.48	n ² 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// 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)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 2Windows Type 3Windows Type 4Windows Type 5Windows Type 6Windows Type 7Windows Type 8Windows Type 9RooflightsWalls147.2Roof Type19.48Roof Type271.6712.74	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 9.48 58.93	n ² 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// 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)
ELEMENTGross area (m²)Openings m²Windows Type 1Windows Type 2Windows Type 3Windows Type 3Windows Type 4Windows Type 5Windows Type 5Windows Type 6Windows Type 7Windows Type 7Windows Type 8Windows Type 9Rooflights147.228.93Roof Type19.480Roof Type271.6712.74Total area of elements, m²Total area of elements, m²	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 9.48 58.93 228.3	$ \begin{array}{c} n^{2} \\ x^{1/} \\ x^{1/$	W/m2 (1/(1.4)+ (1/(1.4)+)	K 0.04] = 0.04] =	(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				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, $W/K = S (A \times U)$

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(00)

(00)

.

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



Heat capacity $Cm = S(A \times k)$									((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)



Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a Temperature factor from Table 2b											,	0 0 0		(51) (52) (53)
Energy	lost fro	m water	storage	, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(54)
Enter	(50) or ((54) in (5	55)									0		(55)
Waters	storage	loss cal	culated f	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 contains	s dedicate	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
Primary	v circuit	loss (an	nual) fro	om Table	3							0		(58)
Primary	y circuit	loss cal	culated	for each	month (. ,	5 × (41) ng and a		r thermo	stat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss cal	culated	for each	month ((61)m –	(60) <u>-</u> 36	55 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	1	(61)
L													l (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	(33)+ (81)	(62)
`´								/) (enter '0					1	
								pendix C		loonthout		i neating)		
(63)m=	0	0	0	0	0	0	0	0	0	0	0	0		(63)
`΄΄ Ι FHRS	55.84	40.78	31.2	16.65	10.33	8.06	7.72	8.7	8.75	23.4	40.95	56.3	1	(63) (G2)
WWHRS		-48.54	-49.54	-40.75	-37.83	-31.2	-26.4	-31.97	-32.9	-40.69	-47.14	-53.33		(63) (G10)
Output	from w	ater hea	ter											
(64)m=	106.75	102.54	120.58	122.82	126.89	114.83	113.39	123.89	124.11	122.81	109.84	102.81		
` ´ I											r (annual)₁	12	1391.27	(64)
Heat a	ains froi	m water	heating.	kWh/m	onth 0.2	5 ´ [0.85	x (45)m	+ (61)m	$1 + 0.8 \times 10^{-1}$	(46)m	+ (57)m	+ (59)m	1	1
(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	de (57)ı	m in calc	culation of	L of (65)m	only if c	l vlinder i	s in the c	l dwellina	or hot w	ater is fr	om com	munity h	eating	
	. ,			5 and 5a		y in laor is		arronning.			oni com	interney in	oaang	
					/•									
Metabo	Jan Jan	s (Table 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)
								lso see			_	-	1	
(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	1	(67)
								3a), also				. 0.20	1	
(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	1	(68)
L											407.00	407.10	I	(00)
(69)m=	55.39	55.39	55.39	55.39	55.39	55.39	55.39	, also se 55.39	55.39	5 55.39	55.39	55.39		(69)
L					55.58	55.58	55.58	55.58	55.58	55.58	55.58	55.58	l	
(70)m=	and far	ns gains 3	(Table 5 3	3 3	3	3	3	3	3	3	3	3		(70)
							3	3	ى ك	3	3	3]	(10)
r			· •	tive valu	<i>,</i> ,	, 	146 54	146 54	140 54	146 54	146 54	110 54		(71)
(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	ł	(11)



(72)= 82.40 60.1 86.14 78.4 73.54 66.67 61.43 68.86 71.72 78.7 86.57 80.11 (72) Total internal gains = (60)m + (60)m + (60)m + (70)m + (70)m - (70)m - (72)m (73)m (73)m (73)m (73)m (80)m + (70)m + (70)m + (70)m - (70)m (73)m (73)m (80)m + (80)m + (80)m + (70)m + (70)m - (72)m (73)m (73)m (80)m + (80)m + (70)m + (70)m - (72)m (73)m (73)m (80)m + (80)m + (70)m + (70)m + (70)m + (72)m (73)m (73)m (73)m (73)m (73)m (80)m + (80)m + (70)m + (70)m + (70)m + (70)m + (70)m (80 m + 7m (73)m (73)m (73)m (73)m (73)m (73)m Table 6a (74)m (73)m (73)m (73)m (73)m (73)m (73)m (73)m <th>Water heating</th> <th colspan="12">Water heating gains (Table 5)</th>	Water heating	Water heating gains (Table 5)														
(73)me 73.6.5 73.0.22 701.8.6 67.71 61.122 560.75 640.2 562.7 627.18 678.68 714.82 (73) Solar geinas are accolated equations to convert to the applicable orientation. Orientation: Orientation: <td></td> <td></td> <td>́T</td> <td>78.4</td> <td>73.54</td> <td>6</td> <td>6.67</td> <td>61.43</td> <td>68.</td> <td>85 71.</td> <td>.72</td> <td>78.7</td> <td>86.57</td> <td>90.11</td> <td>7</td> <td>(72)</td>			́T	78.4	73.54	6	6.67	61.43	68.	85 71.	.72	78.7	86.57	90.11	7	(72)
6. Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation. Orientation: Access Factor Table 6d Area m ² Flux Table 6a Q Table 6b FF Table 6c Gains (W) Northeast 0.9x 0.77 × 2.53 × 11.28 × 0.76 × 0.7 = 10.52 (75) Northeast 0.9x 0.77 × 2.53 × 11.28 × 0.76 × 0.7 = 10.52 (75) Northeast 0.9x 0.77 × 2.53 × 11.28 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 </td <td>Total interna</td> <td>l gains =</td> <td></td> <td></td> <td></td> <td></td> <td>(66)m</td> <td>+ (67)m</td> <td>1 + (68</td> <td>3)m + (69)</td> <td>m + (7</td> <td>′0)m +</td> <td>(71)m + (72)</td> <td>m</td> <td>_</td> <td></td>	Total interna	l gains =					(66)m	+ (67)m	1 + (68	3)m + (69)	m + (7	′0)m +	(71)m + (72)	m	_	
<th< td=""><td>(73)m= 735.51</td><td>730.22</td><td>701.95</td><td>657.71</td><td>611.22</td><td>5</td><td>69.75</td><td>546.2</td><td>556</td><td>.52 582</td><td>2.7</td><td>627.18</td><td>676.68</td><td>714.82</td><td>7</td><td>(73)</td></th<>	(73)m= 735.51	730.22	701.95	657.71	611.22	5	69.75	546.2	556	.52 582	2.7	627.18	676.68	714.82	7	(73)
Orientation: Acess Factor Table 6d Area m ² Flux Table 6a g_ FF Table 6b Gains Table 6c Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 21.42 (75) Northeast 0.4x 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.4x 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.4x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) <t< td=""><td>6. Solar gair</td><td>IS:</td><td></td><td></td><td></td><td>- -</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td></t<>	6. Solar gair	IS:				- -									_	
Table 6d m² Table 6a Table 6b Table 6c (W) Northeast 0.sk 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 75) Northeast 0.sk 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.sk 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 21.42 (75) Northeast 0.sk 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.sk 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sk 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sk 0.77	Solar gains are	calculated	using solar	flux from	Table 6a	and	associat	ed equa	tions	to convert	to the	applic	able orientat	ion.		
Northeast 0.9 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9 0.77 × 2.53 × 21.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9 0.77 × 2.53 × 11.38 × 0.76 × 0.77 <td< td=""><td></td><td></td><td>actor</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>			actor													
Northeast 0.% 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.% 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.% 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 1.38 0.76 x 0.77 =		Table 6d		m²			Tabl	e 6a		Table	6b		Table 6c		(W)	
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 0.77 = 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 0.7 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 21.97 x 0.76 x 0.7 = 21.42 (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 67.96 x 0.76 x 0.7 = <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>11.</td> <td>28</td> <td>x</td> <td>0.70</td> <td>6</td> <td>x</td> <td>0.7</td> <td>=</td> <td>10.52</td> <td>2 (75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	11.	28	x	0.70	6	x	0.7	=	10.52	2 (75)
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 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 0.7 = 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 =<	Northeast 0.9x	0.77	x	2.5	53	x	11.	28	x	0.70	6	×	0.7	=	10.5	2 (75)
Northeast 0.9x 0.77 x 2.53 x 22.97 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9x 0.77 x 2.53 x 22.97 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9x 0.77 x 2.53 x 22.97 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 21.42 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.7 = 38.6 (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 67.96 x 0.76 x 0.7		0.77	x	2.5	53	x	11.	28	x	0.70	6	×	0.7	=	10.5	2 (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 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 = 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 0.7 = 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 <	Northeast 0.9x	0.77	x	2.5	53	x	11.	28	x	0.70	6	×	0.7	=	10.52	<u>2</u> (75)
Northeast 0.3x 0.77 × 2.53 × 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 = 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 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35	Northeast 0.9x	0.77	x	2.5	53	x	22.	97	x	0.70	6	×	0.7	=	21.42	2 (75)
Northeast 0.9x 0.77 × 2.53 × 20.76 × 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 × 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 = 65.2	Northeast 0.9x	0.77	x	2.5	53	x	22.	97	x	0.70	6	×	0.7	=	21.42	2 (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 × 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	Northeast 0.9x	0.77	x	2.5	53	x	22.	97	x	0.70	6	x	0.7	=	21.42	2 (75)
Northeast 0.97 x 2.53 x 41.38 x 0.76 x 0.77 s 2.63 x 41.38 x 0.76 x 0.77 s 2.63 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 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x	Northeast 0.9x	0.77	X	2.5	53	x	22.	97	x	0.7	6	x	0.7	=	21.42	2 (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 67.96 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 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 = 65.2 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 <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>41.</td><td>38</td><td>x</td><td>0.7</td><td>6</td><td>×</td><td>0.7</td><td>=</td><td>38.6</td><td>(75)</td></td<>	Northeast 0.9x	0.77	X	2.5	53	x	41.	38	x	0.7	6	×	0.7	=	38.6	(75)
Northeast $0.9x$ 0.77x2.53x41.38x0.76x0.7=38.6(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x97.38x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x97.38x0.76	Northeast 0.9x	0.77	X	2.5	53	x	41.	38	x	0.70	6	×	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 = 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 × 9	Northeast 0.9x	0.77	x	2.5	53	x	41.	38	x	0.70	6	×	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 × 0.7 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.7 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.7 = 63.39 (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 × 0.7 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 97.3	Northeast 0.9x	0.77	x	2.5	53	x	41.	38	x	0.70	6	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 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77	Northeast 0.9x	0.77	x	2.5	53	x	67.	96	x	0.70	6	×	0.7	=	63.3	9 (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 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 = 63.2 (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 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	Northeast 0.9x	0.77	x	2.5	53	x	67.	96	x	0.70	6	×	0.7	=	63.3	9 (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 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 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 = 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	Northeast 0.9x	0.77	x	2.5	53	x	67.	96	x	0.70	6	x	0.7	=	63.3	ə (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 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 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 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	67.	96	x	0.70	6	x	0.7	=	63.3	9 (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 x 97.38 x 0.76 x 0.77 = 84.97 (75) Northeast 0.9x 0.77 x 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>91.</td><td>35</td><td>x</td><td>0.70</td><td>6</td><td>×</td><td>0.7</td><td>=</td><td>85.2</td><td>(75)</td></td<>	Northeast 0.9x	0.77	x	2.5	53	x	91.	35	x	0.70	6	×	0.7	=	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 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 91.1 x 0.76 x 0.77 = 84.97 (75) Northeast 0.9x 0.77 x 2.53 <t< 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.</td><td>35</td><td>x</td><td>0.70</td><td>6</td><td>x</td><td>0.7</td><td>=</td><td>85.2</td><td>(75)</td></t<>	Northeast 0.9x	0.77	x	2.5	53	x	91.	35	x	0.70	6	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 $=$ 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 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	0.70	6	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 $=$ 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 </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.</td> <td>35</td> <td>x</td> <td>0.70</td> <td>6</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	0.70	6	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.</td> <td>38</td> <td>x</td> <td>0.70</td> <td>6</td> <td>×</td> <td>0.7</td> <td>=</td> <td>90.84</td> <td>4 (75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	97.	38	x	0.70	6	×	0.7	=	90.84	4 (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	x	2.5	53	x	97.	38	x	0.70	6	×	0.7	=	90.84	4 (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	2.5	53	x	97.	38	x	0.70	6	×	0.7	=	90.84	4 (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	2.5	53	x	97.	38	x	0.70	6	×	0.7	=	90.84	4 (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	2.5	53	x	91	.1	x	0.70	6	×	0.7	=	84.9	7 (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	2.5	53	x	91	.1	x	0.70	6	- X	0.7	=	84.9	7 (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	2.5	53	x	91	.1	x	0.70	6	x	0.7	=	84.9	7 (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	2.5	53	x	91	.1	x	0.70	6	×	0.7	=	84.9	7 (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	2.5	53	x	72.	63	x	0.70	6	- x	0.7	= =	67.74	4 (75)
	Northeast 0.9x	0.77	x	2.5	53	x	72.	63	x	0.70	6	x	0.7	=	67.74	4 (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	2.5	53	x	72.	63	x	0.70	6	- x	0.7	= =	67.74	4 (75)
	Northeast 0.9x	0.77	x	2.5	53	x	72.	63	x	0.7	6	x	0.7	= =	67.74	4 (75)

Northeast 0.9x	0.77	×	2.53	×	50.42	×	0.76	x	0.7] =	47.03	(75)
Northeast 0.9x	0.77	×	2.53	×	50.42	×	0.76	x	0.7	1 =	47.03	(75)
Northeast 0.9x	0.77	x	2.53	×	50.42	x	0.76	x	0.7	i =	47.03	(75)
Northeast 0.9x	0.77	X	2.53	×	50.42	×	0.76	x	0.7	i =	47.03	(75)
Northeast 0.9x	0.77] ×	2.53	×	28.07	x	0.76	x	0.7	j =	26.18	(75)
Northeast 0.9x	0.77	×	2.53	×	28.07	×	0.76	x	0.7	i =	26.18	(75)
Northeast 0.9x	0.77	×	2.53	×	28.07	x	0.76	x	0.7	i =	26.18	(75)
Northeast 0.9x	0.77	x	2.53	×	28.07	x	0.76	x	0.7	=	26.18	(75)
Northeast 0.9x	0.77	×	2.53	×	14.2	×	0.76	x	0.7] =	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	14.2	x	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	14.2	x	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	×	9.21	x	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)
Northeast 0.9x	0.77	x	2.53	x	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)
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	×	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	x	85.75		0.76	x	0.7	=	167.88	(79)
Southwest _{0.9x}	0.77	x	8.12	×	85.75		0.76	x	0.7	=	256.71	(79)
Southwest _{0.9x}	0.77	x	3.42	×	85.75		0.76	x	0.7	=	108.12	(79)
Southwest _{0.9x}	0.77	x	5.31	×	106.25		0.76	x	0.7	=	208.01	(79)
Southwest _{0.9x}	0.77	×	8.12	×	106.25		0.76	x	0.7	=	318.08	(79)
Southwest _{0.9x}	0.77	×	3.42	×	106.25	ļ	0.76	x	0.7	=	133.97	(79)
Southwest _{0.9x}	0.77	×	5.31	×	119.01		0.76	x	0.7	=	232.98	(79)
Southwest0.9x	0.77	×	8.12	×	119.01		0.76	x	0.7] =	356.28	(79)
Southwest _{0.9x}	0.77	×	3.42	x	119.01		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)
Southwest0.9x	0.77	×	8.12	×	118.15		0.76	x	0.7	=	353.7	(79)
Southwest _{0.9x}	0.77	×	3.42	×	118.15		0.76	x	0.7] =	148.97	(79)
Southwest _{0.9x}	0.77	×	5.31	X	113.91		0.76	x	0.7	=	223	(79)
Southwest _{0.9x}	0.77	×	8.12	×	113.91		0.76	x	0.7] =	341	(79)
Southwesto.9x	0.77	×	3.42	×	113.91		0.76	x	0.7] =	143.62	(79)
Southwesto a	0.77	X	5.31	X	104.39		0.76	x	0.7] =	204.36	(79)
Southwesto a	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] =	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	92.85	İ	0.76	x	0.7	=	117.07	(79)
Southwest _{0.9x}	0.77	x	5.31	x	69.27	Ì	0.76	x	0.7	=	135.6	(79)
Southwest _{0.9x}	0.77	x	8.12	x	69.27		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)
Southwest0.9x	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)
Southwest _{0.9x}	0.77	x	5.31	x	31.49		0.76	x	0.7	=	61.64	(79)
Southwest0.9x	0.77	x	8.12	x	31.49		0.76	x	0.7	=	94.26	(79)
Southwest _{0.9x}	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	x	1.27	x	11.28	×	0.76	x	0.7	=	5.28	(81)
Northwest 0.9x	0.77	x	0.69	x	22.97	×	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	x	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	x	0.76	x	0.7	=	19.37	(81)
Northwest 0.9x	0.77	x	0.69	x	67.96	x	0.76	x	0.7	=	17.29	(81)
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	91.35	x	0.76	x	0.7	=	23.24	(81)
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	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	×	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	×	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	×	0.76	x	0.7	=	34.01	(81)
Northwest 0.9x	0.77	x	0.69	x	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	x	1.27	x	28.07	×	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	=	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)
Rooflights 0.9x	1	x	12.74	x	20.24	×	0.76	x	0.7	=	123.44	(82)
Rooflights 0.9x	1	x	12.74	×	40.55	×	0.76	x	0.7	=	247.33	(82)
Rooflights 0.9x	1	x	12.74	×	74.78	×	0.76	x	0.7	=	456.16	(82)
Rooflights 0.9x	1	x	12.74	×	130.19	×	0.76	x	0.7	=	794.13	(82)
Rooflights 0.9x	1	x	12.74	×	183.82	×	0.76	x	0.7	=	1121.29	(82)
Rooflights 0.9x	1	x	12.74	×	200.21	×	0.76	x	0.7	=	1221.24	(82)





Doofligh									1			_	_					
Roofligh	L	1	×	12.		x		85.57	X		0.76	_ ×	Ļ	0.7		=	1131.99	(82)
Roofligh	L	1	X	12.	74	x	14	42.19	X		0.76	_ ×	Ļ	0.7		=	867.36	(82)
Roofligh		1	x	12.	74	x	9	3.09	X		0.76	_ ×	Ļ	0.7		=	567.83	(82)
Roofligh	L	1	x	12.	74	x	4	9.71	X		0.76	_ ×	Ļ	0.7		=	303.23	(82)
Roofligh	L	1	X	12.	74	x	2	5.27	X		0.76	×	Ļ	0.7		=	154.14	(82)
Roofligh	its 0.9x	1	x	12.	74	x	1	6.69	x		0.76	×		0.7		=	101.83	(82)
Ť				for eac					<u> </u>		um(74)m .	<u>, </u>					1	(00)
` '	402.26	738.95		1756.84					183	9.3	1369.2	858	54	491.14	338	.48	J	(83)
Ē				r (84)m =							4054.0			4407.00			1	(0.4)
(84)m=	1137.77	1469.18	1875.1	2414.54	2878.65	29	58.67	2791.54	239	5.82	1951.9	1485	.72	1167.82	105	3.3		(84)
7. Mea	an inter	nal temp	erature	(heating	season)												
Tempe	erature	during h	eating p	eriods ir	n the livir	ng a	area f	from Tab	ole 9	, Th′	1 (°C)						21	(85)
Utilisat	tion fac	tor for g	ains for	living are	ea, h1,m	(se	ee Ta	ble 9a)				ı —			1			
	Jan	Feb	Mar	Apr	May		Jun	Jul	A	ug	Sep	0	ct	Nov	D	ec		
(86)m=	0.99	0.97	0.92	0.75	0.53	(0.36	0.26	0.3	32	0.57	0.8	9	0.98	0.9	99		(86)
Mean	internal	l temper	ature in	living ar	ea T1 (fo	ollo	w ste	ps 3 to 7	' in T	Table	e 9c)							
(87)m=	19.87	20.14	20.51	20.85	20.97		21	21	2	1	20.97	20.	71	20.2	19.	81		(87)
Tempe	erature	durina h	eating r	eriods ir	rest of	dw	ellina	from Ta	ble 9	9 TH	اری (°C)						<u>.</u>	
(88)m=	19.9	19.9	19.9	19.91	19.91		9.91	19.91	19.		19.91	19.	91	19.91	19.	91]	(88)
	tion foo	tor for a	ning for	l	volling	ـــــــــــــــــــــــــــــــــــــ			<u> </u>					I			1	
(89)m=	0.99	0.97	0.89	rest of d	0.47		0.3		9a) 0.2	24	0.49	0.8	5	0.97	0.9	90	1	(89)
Ľ				-	_								-	0.07	0.0		1	()
				the rest		<u> </u>			i —			<u> </u>		10.01		~ (1	(00)
(90)m=	18.42	18.81	19.33	19.76	19.89	1	9.91	19.91	19.	.91	19.89	19.0	-	18.91 g area ÷ (4	18.	34		(90) T(04)
											I	LA = 1		iy area - (4	+) =		0.47	(91)
Mean	interna	ltemper	ature (fo	or the wh	ole dwe	lling	g) = fl	_A × T1			A) × T2						•	
(92)m=	19.09	19.43	19.88	20.27	20.39	2	0.42	20.42	20.	.42	20.4	20.	13	19.51	19.	02	J	(92)
· · · · · ·				n interna		_						r <u> </u>					1	()
(93)m=	18.94	19.28	19.73	20.12	20.24	2	0.27	20.27	20.	.27	20.25	19.9	98	19.36	18.	87		(93)
		ting requ			• - •							. —						
				mperatu using Ta		ed	at ste	ep 11 of	lab	le 9b	, so tha	t Ti,r	∩=(76)m an	d re-	calo	culate	
	Jan	Feb	Mar	Apr	May		Jun	Jul	Δ	ug	Sep	0	rt	Nov		ec	1	
L Utilisat		tor for g		· · ·	May		oun	Uui		ug [Ocp			1101		00	1	
(94)m=	0.99	0.96	0.89	0.71	0.49	0).32	0.22	0.2	27	0.51	0.8	5	0.97	0.9	99]	(94)
L Useful	l gains,	hmGm ,	W = (94	۱ 4)m x (8	4)m												1	
-	-		· ·	1716.12	<i>,</i>	94	42.07	611.27	643	3.62	1003.77	1262	.39	1133.19	104	2.99]	(95)
Month	ly avera	age exte	rnal tem	perature	from Ta	able	e 8											
(96)m=	4.3	4.9	6.5	8.9	11.7	1	14.6	16.6	16	5.4	14.1	10.	6	7.1	4.	2]	(96)
Heat lo	oss rate	e for mea	an interr	al tempe	erature,	Lm	, W =	=[(39)m :	x [(9	3)m-	- (96)m]						
(97)m=	2467.4	2420.97	2225.72	1878.77	1429.76	94	44.68	611.58	644	.45	1026.26	1569	.01	2055.48	246	3.1]	(97)
Space	heating	g require	ement fo	r each n	nonth, k\	Nh	/mont	h = 0.02	24 x	[(97)	m – (95)m] x	(4	1)m			-	
(98)m=	1000.6	677.2	414.41	117.11	18.79		0	0	C)	0	228	12	664.05	105	6.56	J	



												-		7
								Tota	l per year	(kWh/year) = Sum(9	8)15,912 =	4176.84	(98)
Space	e heatin	g require	ement in	n kWh/m²	²/year								30.32	(99)
9a. En	ergy rec	quiremer	nts – Ind	ividual h	eating s	ystems ii	ncluding	micro-C	HP)					
•	e heatii	•										1		1,004
	•					ementary		(202) = 1 -	_ (201) _				0	(201)
				nain syst				$(202) = 1^{-2}$ (204) = (20)		(203)] -			1	(202)
			-	main sys				(204) – (20	52) x [1 -	(200)] –			1	(204)
	•	-		ting syste		a ovetom	0/						90.4	(206)
EIIICIE	-	· · · · ·		1	- 	g system			0			Du	0	(208)
Snace	Jan A heatin	Feb	Mar	Apr calculate	May d above	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	(r
Opaci	1000.6	677.2	414.41	117.11	18.79	0	0	0	0	228.12	664.05	1056.56		
(211)m) = {[(98)m x (20	1)4)] } x 1	100 ÷ (20										(211)
(,	1106.86	i	458.41	129.55	20.79	0	0	0	0	252.34	734.57	1168.76		
								Tota	l (kWh/yea	ar) =Sum(2	2 11) _{15,1012}	-	4620.4	(211)
Space	e heatin	g fuel (s	econdar	·y), kWh/	month							•		-
		01)]	· · · ·	1										
(215)m=	0	0	0	0	0	0	0	0 Tota	0	0	0 215) _{15,1012}	0		
Matar	h o otina							TOTA	i (KVVII/yea	ar) =0um(2	10) _{15,10} 12	-	0	(215)
	heating from w		ter (calc	ulated a	bove)									
	106.75	102.54	120.58	122.82	126.89	114.83	113.39	123.89	124.11	122.81	109.84	102.81		
Efficier	ncy of w	ater hea	ater										80.3	(216)
(217)m=	89.32	88.93	87.91	84.93	81.47	80.3	80.3	80.3	80.3	86.59	88.81	89.4		(217)
		heating, m x 100												
(219)m=		115.3	137.17	144.61	155.75	143.01	141.2	154.29	154.55	141.84	123.68	115		
I								Tota	I = Sum(2	19a) ₁₁₂ =			1645.9	(219)
	I totals									k	Wh/year		kWh/year	-
Space	heating	fuel use	ed, main	system	1								4620.4]
Water	heating	fuel use	d										1645.9]
Electric	city for p	oumps, f	ans and	electric	keep-ho	t								
centra	al heatir	ng pump	:									30		(230c)
boiler	with a f	an-assis	sted flue									45		(230e)
Total e	lectricit	y for the	above,	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
	city for I		,	,								l	483.11	(232)
	•		vidual he	eating sy	stems.							l]()
- 10 a. 1				Samig Sy	otemo.									
						Fu kW	el /h/year			Fuel P (Table			Fuel Cost £/year	
Space	heating	ı - main s	system ?	1		(211	l) x			3.4	8	x 0.01 =	160.79	(240)



Space heating - main system 2	(2	213)	x		0	x 0.01 =	0	(241)
Space heating - secondary	(2	215)	x		13.19	x 0.01 =	0	(242)
Water heating cost (other fuel)	(2	219)			3.48	x 0.01 =	57.28	(247)
Pumps, fans and electric keep-hot	(2	231)			13.19	x 0.01 =	9.89	(249)
(if off-peak tariff, list each of (230a) to (2 Energy for lighting		ely a 232)	as applicable and	l apply		ording to $\frac{1}{x 0.01} =$		
	(4	.02)			13.19	x 0.01 -	63.72	(250)
Additional standing charges (Table 12)							120	(251)
	OI	ne of	(233) to (235) x)		13.19	x 0.01 =	0	(252)
Appendix Q items: repeat lines (253) ar	. ,							
Total energy cost	(245)(247) + (250)	(254) =				411.68	(255)
11a. SAP rating - individual heating sy	stems							_
Energy cost deflator (Table 12)							0.42	(256)
Energy cost factor (ECF)	[(255) x (256)] ÷	· [(4)	+ 45.0] =				0.95	(257)
SAP rating (Section 12)							86.8	(258)
12a. CO2 emissions – Individual heati	ng systems ind	clud	ing micro-CHP					
		i ner Wh	' gy /year		Emission fa kg CO2/kWh		Emissions kg CO2/yea	r
Space heating (main system 1)	(2	211)	x		0.216	=	998.01	(261)
Space heating (secondary)	(2	215)	x		0.519	=	0	(263)
Water heating	(2	219)	x		0.216	=	355.52	(264)
Space and water heating	(2	261) -	+ (262) + (263) + (264	4) =			1353.52	(265)
Electricity for pumps, fans and electric k	eep-hot (2	31)	x		0.519	=	38.93	(267)
Electricity for lighting	(2	232)	x		0.519	=	250.74	(268)
Energy saving/generation technologies Total CO2, kg/year				sum o	f (265)(271) =		1643.18	(272)
CO2 emissions per m ²				(272) -	÷ (4) =		11.93	(273)
El rating (section 14)							88	(274)
13a. Primary Energy								
		i ner Wh	'gy /year		Primary factor		P. Energy kWh/year	
Space heating (main system 1)	(2	211)	x		1.22	=	5636.88	(261)
Space heating (secondary)	(2	215)	x		3.07	=	0	(263)
Energy for water heating	(2	219)	x		1.22	=	2008	(264)
Space and water heating	(2	261) -	+ (262) + (263) + (264	4) =			7644.89	(265)
Electricity for pumps, fans and electric k	eep-hot (2	231)	x		3.07	=	230.25	(267)
Electricity for lighting	(2	232)	x		0	=	1483.16	(268)



Energy saving/generation technologies 'Total Primary Energy

Primary energy kWh/m²/year

sum of (265)(271) =	9358.3	(272)
(272) ÷ (4) =	67.93	(273)



				User I	Details:						
Assessor Name:	Peter Mitcl	nell			Strom	a Num	ber:		STRO	007945	
Software Name:	Stroma FS		2			are Vei				on: 1.0.3.15	
			Р	roperty	Address			END) CI			
Address :	New Dwellir	ng at:, G								(
1. Overall dwelling dime	nsions:										
				Are	ea(m²)		Av. Hei	ight(m)		Volume(m ³)	
Ground floor					73.62	(1a) x	2	2.4	(2a) =	176.69	(3a)
First floor					64.14	(1b) x	3	.32	(2b) =	212.94	(3b)
Total floor area TFA = (1a	a)+(1b)+(1c)+	(1d)+(1e	e)+(1n	ı)	137.76	(4)					
Dwelling volume						(3a)+(3b))+(3c)+(3d	l)+(3e)+	.(3n) =	389.63	(5)
2. Ventilation rate:											
	main heating		econdar leating	У	other		total			m ³ per hour	
Number of chimneys	0] + [0] + [0] = [0	X 4	40 =	0	(6a)
Number of open flues	0] + [0] + [0] = [0	x 2	20 =	0	(6b)
Number of intermittent fa	ns						2	x ′	10 =	20	(7a)
Number of passive vents						Γ	0	x ^	10 =	0	(7b)
Number of flueless gas fi	res					Ē	0	x 4	40 =	0	(7c)
									Air oh	angee ner he	_
lefiltertien due te chieren			o) . (Ch) . (7	(7 b)	(70)	-				anges per ho	_
Infiltration due to chimney If a pressurisation test has b						continue fr	20 0 <i>m (9) to (</i>		÷ (5) =	0.05	(8)
Number of storeys in th			, procoo	<i>i</i> to (<i>11)</i> ,				10)		0	(9)
Additional infiltration	Ū (,						[(9)-	-1]x0.1 =	0	(10)
Structural infiltration: 0.	25 for steel or	r timber f	frame or	0.35 fc	or mason	ry constr	ruction			0	(11)
if both types of wall are pr			ponding to	the grea	ter wall are	ea (after					-
deducting areas of openir If suspended wooden f			ed) or 0.	1 (seal	ed). else	enter 0				0	(12)
If no draught lobby, ent				(0	(13)
Percentage of windows	·		ripped							0	(14)
Window infiltration		Ũ			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 h	our per s	quare m	etre of e	nvelope	area	4	(17)
If based on air permeabil	ty value, then	(18) = [(1	7) ÷ 20]+(8	3), otherv	vise (18) =	(16)				0.25	(18)
Air permeability value applie	s if a pressurisati	on test has	s been don	e or a de	egree air pe	rmeability	is being us	sed			
Number of sides sheltere	d									3	(19)
Shelter factor						[0.075 x (1	[9)] =			0.78	(20)
Infiltration rate incorporat	•				(21) = (18	s) x (20) =				0.19	(21)
Infiltration rate modified for		· ·								1	
Jan Feb	Mar Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed from Tabl	e 7								1	
(22)m= 5.1 5	4.9 4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7		



Wind 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	l_{1}	L2b)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		<u>, ,</u>	· · · ·	, 	<u>`</u>	<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] = 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)+	K 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] =	(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 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.	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 l	<						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	J	(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	



Primary circuit loss (annual) from Table 3 0 (58) Primary circuit loss calculated for each month (59)m = (58) \div 365 x (41)m (59)m = 0 0 0 0 0 0 0 0 (59) (59)m = 0 0 0 0 0 0 0 0 0 (59) Combi loss calculated for each month (61)m = (60) \div 365 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 (61) Total heat required for water heating calculated for each month (62)m = 0.85 x (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 DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating) (add additional lines if FGHRS and/or WWHRS applies, see Appendix G) (63)m = 0 0 0 0 0 0 0 (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63) (63)	(5)				,	h/litre/da	,	on 4.3	ee secti	eating s	nunity h	
Energy lost from water storage, kWh/year $(47) \times (51) \times (52) \times (53) = 0$ (54) Enter (50) or (54) in (55) (55) (56) (57) (56) (57) (56) (56) (57) (56) (57) (56) (57) (57) (57) (57) (57) (57) (57) (57								2b				
Enter (50) or (54) in (55) 0		53) =	x (52) x (5	(47) x (51)			ar					•
Water storage loss calculated for each month ((56)m = (55) × (41)m (56)m = 0 <td></td> <td></td> <td>x (02) x (0</td> <td>(11) x (01)</td> <td></td> <td></td> <td>501</td> <td>, itt vii/yt</td> <td>-</td> <td></td> <td></td> <td>•••</td>			x (02) x (0	(11) x (01)			501	, itt vii/yt	-			•••
(6)m 0		m	55) × (41)r	((56)m = (month	for each		. , .	, ,	
If cylinder contains dedicated solar storage, (57)m = (56)m × ((50) - (H11)] + (50), else (57)m = (56)m where (H11) is from Appendix H (57)m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 (56)	0	0	0	0	0						г
Primary circuit loss (annual) from Table 3 0		-	-			-				-		` '
Primary circuit loss (annual) from Table 3 0	0 0 0 (57)	0	0	0	0	0	0	0	0	0	0	(57)m=
Primary circuit loss calculated for each month $(59)m = (58) \div 365 \times (41)m$ (modified by factor from Table H5 if there is solar water heating and a cylinder thermostat) (59)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(58)										, oirouit	L
Combi loss calculated for each month (61)m = (60) \div 365 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 heat required for water heating calculated for each month (62)m = $0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$ (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 DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating) (add additional lines if FGHRS and/or WWHRS applies, see Appendix G) (63)m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 (63) FHRS 58.71 45.3 34.79 18.74 10.68 8.06 7.72 8.7 8.75 26.14 45.71 59.07 (63) (G2) WWHRS -55.17 -48.54 -49.54 -40.75 -37.83 -31.2 -26.4 -31.97 -32.9 -40.69 -47.14 -53.33 (63) (G1) Output from water heater (64)m = 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 Uutput from water heater (64)m = 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 Uutput from water heater (64)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) include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating 5. Internal gains (see Table 5 and 5a):		r thermo		• • •	,		month (for each	culated	loss cal	circuit	Primary
	0 0 0 (59)	0	0	0	0	0	0	0	0	0	0	(59)m=
Total heat required for water heating calculated for each month (62)m = $0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$ (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 DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating) (add additional lines if FGHRS and/or WWHRS applies, see Appendix G) (63) (63)m 0 0 0 0 0 0 0 0 (63) (FHRS 58.71 45.3 34.79 18.74 10.68 8.06 7.72 8.7 8.75 26.14 45.71 59.07 (63) (G1 Output from water heater (64)m = 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 04 04 04 04 04 04 04 1367.56 (64) Heat gains from water heating, kWh/month 0.25 ' [0.85 × (45)m + (61)m] + 0.8 × [(46)m + (57)m + (59)m] 1367.56 (64) (65) (65) (65) (65) (65) (65) (65))m	65 × (41)	(60) ÷ 36	(61)m =	month (for each	lculated	loss cal	Combi
	50.96 49.32 50.96 (61)	50.96	49.32	49.52	47.41	45.88	49.52	49.32	50.96	46.03	50.96	(61)m=
Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating) (add additional lines if FGHRS and/or WWHRS applies, see Appendix G) (63)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(45)m + (46)m + (57)m + (59)m + (61)m	(45)m + (0.85 × ((62)m =	n month	for eac	alculated	eating ca	water he	uired for	eat requ	Total he
(add additional lines if FGHRS and/or WWHRS applies, see Appendix G) (63) $m = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $				r –		1		<u> </u>	· · · · · ·			г
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	r contribution to water heating)	r contributi	if no solar	/) (enter '0	/e quantity	H (negati	· Appendix	endix G or	using App	calculated	W input o	L Solar DH
FHRS 58.71 45.3 34.79 18.74 10.68 8.06 7.72 8.7 8.75 26.14 45.71 59.07 (63) (G2 WWHRS -55.17 -48.54 -49.54 -40.75 -37.83 -31.2 -26.4 -31.97 -32.9 -40.69 -47.14 -53.33 (63) (G1 Output from water heater (64)m= 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 Output from water heater (64)m= 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 Output from water heater (annual) 112 1367.56 (64) Heat gains from water heating, kWh/month 0.25 $[0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]$ (65) (65)m= 68.81 60.55 63.34 56.45 48 45.7			G)	pendix (see Ap	applies	WWHRS	and/or V	FGHRS	l lines if	ditional	(add ac
WWHRS -55.17 -48.54 -49.54 -40.75 -37.83 -31.2 -26.4 -31.97 -32.9 -40.69 -47.14 -53.33 (63) (G1 Output from water heater (64)m= 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 Output from water heater (annual)112 1367.56 (64) Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)m + (61)m] + 0.8 × [(46)m + (57)m + (59)m] (65) (65) (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) include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating 65) 51.11 100.04 (65) 5. Internal gains (see Table 5 and 5a): 54.71 48 45.7 51.22 51.64 58.55 62.33 67.04 (65)	0 0 0 (63)	0	0	0	0	0	0	0	0	0	0	(63)m=
Output from water heater $(64)m =$ 103.88 98.01 116.98 120.74 126.54 114.83 113.39 123.89 124.11 120.07 105.08 100.04 Output from water heater (annual) ₁₁₂ 1367.56 (64) Heat gains from water heating, kWh/month $0.25 \ (0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]$ (65)m= (65.81) 60.55 63.34 56.45 54.71 48 45.7 51.22 51.64 58.55 62.33 67.04 (65) include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating 5. Internal gains (see Table 5 and 5a):	26.14 45.71 59.07 (63) (G2)	26.14	8.75	8.7	7.72	8.06	10.68	18.74	34.79	45.3	58.71	FHRS
$ \begin{array}{c} (64)m= \end{array} \begin{array}{c ccccccccccccccccccccccccccccccccccc$	-40.69 -47.14 -53.33 (63) (G10)	-40.69	-32.9	-31.97	-26.4	-31.2	-37.83	-40.75	-49.54	-48.54	-55.17	WWHRS
Output from water heater $(annual)_{112}$ 1367.56 (64) Heat gains from water heating, kWh/month $0.25 \cdot [0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]$ (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) include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating 5. Internal gains (see Table 5 and 5a):									ter	ater hea	from wa	Output
Heat gains from water heating, kWh/month $0.25 [0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]$ (65)m= $\begin{bmatrix} 68.81 & 60.55 & 63.34 & 56.45 & 54.71 & 48 & 45.7 & 51.22 & 51.64 & 58.55 & 62.33 & 67.04 & (65) \\ \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	120.07 105.08 100.04	120.07	124.11	123.89	113.39	114.83	126.54	120.74	116.98	98.01	103.88	(64)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) include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating 5. Internal gains (see Table 5 and 5a):	ater heater (annual) ₁₁₂ 1367.56 (64)	ater heater	out from wa	Outp								-
include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating 5. Internal gains (see Table 5 and 5a):	κ [(46)m + (57)m + (59)m]	(46)m	n] + 0.8 x	+ (61)m	× (45)m	5 ´ [0.85	onth 0.2	kWh/mo	heating,	m water	ains fror	Heat ga
5. Internal gains (see Table 5 and 5a):	58.55 62.33 67.04 (65)	58.55	51.64	51.22	45.7	48	54.71	56.45	63.34	60.55	68.81	(65)m=
	rater is from community heating	ater is fr	or hot w	dwelling	s in the o	ylinder i	only if c	of (65)m	culation	m in calo	de (57)r	inclu
Matabalia gaine (Table 5) Watte):	5 and 5a)	Table 5	ains (see	ernal ga	5. Inte
IVIELADUIL VAINS (TADIE 3), WAIIS								ts	e 5), Wat	s (Table	lic gain	Metabo
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Oct Nov Dec	Oct	Sep	Aug	Jul	Jun	May					Γ
(66)m= 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 145.63 (66)	145.63 145.63 145.63 (66)	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	145.63	(66)m=
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	· · · · · · · · · · · · · · · · · · ·		Table 5	lso see ⁻	[.] L9a), a	ion L9 o	L, equati	opendix	ted in Ap	(calcula	gains	Lighting
(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)	22.6 26.37 28.12 (67)	22.6	17.8	13.26	10.2	9.44	11.18	14.96	19.76	24.3	27.36	(67)m=
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	ble 5	ble 5	see Tal	3a), also	13 or L1	uation L	dix L, eq	n Append	ulated ir	ins (calc	ces gai	Applian
(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)	251.48 273.05 293.31 (68)	251.48	234.4	226.38	229.56	243.1	263.37	284.93	302.01	310.03	306.85	(68)m=
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	9 5	5	e Table), also se	or L15a)	ion L15	L, equat	ppendix	ted in A	(calcula	g gains	Cooking
(69)m= 37.56 37.56 37.56 37.56 37.56 37.56 37.56 37.56 37.56 (69)	37.56 37.56 37.56 (69)	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	37.56	(69)m=
Pumps and fans gains (Table 5a)								5a)	(Table 5	ns gains	and far	Pumps
(70)m= 3 3 3 3 3 3 3 3 3 3 3 (70)	3 3 3 (70)	3	3	3	3	3	3	, 	r`	-		i r
Losses e.g. evaporation (negative values) (Table 5)	······			•		le 5)	es) (Tab	tive valu	n (nega	aporatio	e.g. ev	Losses
(71)m= -116.51 -116.51 -116.51 -116.51 -116.51 -116.51 -116.51 -116.51 -116.51 -116.51 -116.51 (71)	-116.51 -116.51 (71)	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	(71)m=



(72)= 92.40 90.1 86.14 78.4 73.54 66.67 61.43 68.86 71.72 78.7 86.57 90.11 (72) Total internal gains = (60)m + (60)m + (60)m + (70)m + (70)m - (70)m - (72)m (73)m (86.14 47.84 417.78 388.9 370.88 370.81 333.61 422.47 465.68 481.23 (73) (73)m= 466.38 494.12 476.6 477.84 417.78 388.9 370.88 333.61 422.47 465.68 481.23 (73) Start gains are calculated using solar flux from Table 6a and associated equators to convert to the applicable orientation. Orientation: Access Factor Area Flux Q 6 F Orientation: Access Factor Northeast 0.9x 0.77 × 2.53 × 10.52 (75) Northeast 0.9x 0.77 × 2.64.3 × 0.76 0.77 = 0.10.52 <td cols<="" th=""><th>Water heating</th><th>gains (T</th><th>able 5)</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td>	<th>Water heating</th> <th>gains (T</th> <th>able 5)</th> <th></th>	Water heating	gains (T	able 5)														
(7)/m (7)/m <th< td=""><td></td><td></td><td>́</td><td>78.4</td><td>73.54</td><td>6</td><td>6.67</td><td>61.43</td><td>68.</td><td>85 71.72</td><td>78</td><td>8.7</td><td>86.57</td><td>90.11</td><td></td><td></td><td>(72)</td></th<>			́	78.4	73.54	6	6.67	61.43	68.	85 71.72	78	8.7	86.57	90.11			(72)	
(73)m: 496.38 494.12 476.6 447.98 417.70 388.9 370.88 370.18 333.61 422.47 455.68 481.23 (73) Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains Solar gains <th c<="" td=""><td>Total interna</td><td>l gains =</td><td></td><td></td><td></td><td>1</td><td>(66)</td><td>m + (67)m</td><td>+ (68</td><td>3)m + (69)m +</td><td>+ (70)n</td><td>n + (7</td><td>71)m + (72)</td><td>m</td><td></td><td></td><td></td></th>	<td>Total interna</td> <td>l gains =</td> <td></td> <td></td> <td></td> <td>1</td> <td>(66)</td> <td>m + (67)m</td> <td>+ (68</td> <td>3)m + (69)m +</td> <td>+ (70)n</td> <td>n + (7</td> <td>71)m + (72)</td> <td>m</td> <td></td> <td></td> <td></td>	Total interna	l gains =				1	(66)	m + (67)m	+ (68	3)m + (69)m +	+ (70)n	n + (7	71)m + (72)	m			
<th< td=""><td></td><td>-<u> </u></td><td>476.6</td><td>447.98</td><td>417.78</td><td>3</td><td>88.9</td><td>370.88</td><td>378</td><td>.18 393.61</td><td>42</td><td>2.47</td><td>455.68</td><td>481.2</td><td>3</td><td></td><td>(73)</td></th<>		- <u> </u>	476.6	447.98	417.78	3	88.9	370.88	378	.18 393.61	42	2.47	455.68	481.2	3		(73)	
Orientation: Acess Factor Table 6d Area m ² Flux Table 6a g_ FF Table 6b Gains Table 6c Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.4x 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 21.42 (75) Northeast 0.4x 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.4x 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.4x 0.77 × 2.53 × 41.38 × 0.76 × 0.77 = 38.6 (75) <t< td=""><td>6. Solar gain</td><td>IS:</td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td>I</td><td>_</td><td></td><td>I</td><td></td><td></td><td></td><td></td></t<>	6. Solar gain	IS:				1				I	_		I					
Table 6d m² Table 6a Table 6b Table 6c (W) Northeast 0.sk 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 75) Northeast 0.sk 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.sk 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 21.42 (75) Northeast 0.sk 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.sk 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sk 0.77 x 2.53 x 41.38 x 0.76 x 0.77 = 38.6 (75) Northeast 0.sk 0.77	Solar gains are	calculated u	using solar	flux from	Table 6a	and	associ	ated equa	tions	to convert to	the ap	plica	ble orientati	on.				
Northeast 0.9 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9 0.77 × 2.53 × 11.28 × 0.76 × 0.77 = 10.52 (75) Northeast 0.9 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9 0.77 × 2.53 × 22.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9 0.77 × 2.53 × 21.97 × 0.76 × 0.77 = 21.42 (75) Northeast 0.9 0.77 × 2.53 × 11.38 × 0.76 × 0.77 <td< td=""><td></td><td></td><td>actor</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>			actor															
Northeast 0.% 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.% 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (75) Northeast 0.% 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 22.97 x 0.76 x 0.77 = 21.42 (75) Northeast 0.% 0.77 x 2.53 x 1.38 0.76 x 0.77 =		Table 6d		m²			Tab	ole 6a		Table 6	b	Т	able 6c			(W)		
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 0.77 = 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 0.7 = 21.42 (75) Northeast 0.9 0.77 x 2.53 x 21.97 x 0.76 x 0.7 = 21.42 (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 67.96 x 0.76 x 0.7 = <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>1</td> <td>1.28</td> <td>x</td> <td>0.76</td> <td></td> <td>x</td> <td>0.7</td> <td>:</td> <td>- [</td> <td>10.52</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	1	1.28	x	0.76		x	0.7	:	- [10.52	(75)	
Northeast 0.9 0.77 x 2.53 x 11.28 x 0.76 x 0.77 = 10.52 (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 0.7 = 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 =<	Northeast 0.9x	0.77	x	2.5	53	x	1	1.28	x	0.76		×	0.7		- [10.52	(75)	
Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 22.97 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.7 = 21.42 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.7 = 38.6 (75) Northeast 0.9x 0.77 × 2.53 × 41.38 × 0.76 × 0.7 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.7	Northeast 0.9x	0.77	x	2.5	53	x	1	1.28	x	0.76		x	0.7		- [10.52	(75)	
Northeast 0.9x 0.77 x 2.53 x 0.76 x 0.77 x 2.53 x 22.97 x 0.76 x 0.77 z 2.142 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.77 z 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.77 z 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 41.38 x 0.76 x 0.7 z 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 z 63.39 (75) <	Northeast 0.9x	0.77	x	2.5	53	x	1	1.28	x	0.76		×	0.7		- [10.52	(75)	
Northeast 0.3x 0.77 × 2.53 × 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 = 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 × 67.96 × 0.76 × 0.77 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35	Northeast 0.9x	0.77	x	2.5	53	x	2	2.97	x	0.76		×	0.7		= [21.42	(75)	
Northeast 0.9x 0.77 × 2.53 × 2.297 × 0.76 × 0.77 = 2.14.2 (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 × 41.38 × 0.76 × 0.77 = 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	Northeast 0.9x	0.77	x	2.5	53	x	2	2.97	x	0.76		×	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 × 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	Northeast 0.9x	0.77	x	2.5	53	x	2	2.97	x	0.76		×	0.7	:	- [21.42	(75)	
Northeast 0.97 x 2.53 x 41.38 x 0.76 x 0.77 s 2.63 x 41.38 x 0.76 x 0.77 s 2.63 x 41.38 x 0.76 x 0.77 s 2.63 x 41.38 x 0.76 x 0.77 s 2.86 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.77 = 65.2 <t< td=""><td>Northeast 0.9x</td><td>0.77</td><td>x</td><td>2.5</td><td>53</td><td>x</td><td>2</td><td>2.97</td><td>x</td><td>0.76</td><td></td><td>×</td><td>0.7</td><td>:</td><td>= [</td><td>21.42</td><td>(75)</td></t<>	Northeast 0.9x	0.77	x	2.5	53	x	2	2.97	x	0.76		×	0.7	:	= [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 67.96 x 0.76 x 0.77 = 38.6 (75) Northeast 0.9x 0.77 x 2.53 x 67.96 x 0.76 x 0.77 = 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 = 65.2 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 <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>4</td><td>1.38</td><td>x</td><td>0.76</td><td></td><td>×</td><td>0.7</td><td></td><td>- [</td><td>38.6</td><td>(75)</td></td<>	Northeast 0.9x	0.77	x	2.5	53	x	4	1.38	x	0.76		×	0.7		- [38.6	(75)	
Northeast $0.9x$ 0.77x2.53x41.38x0.76x0.7=38.6(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x67.96x0.76x0.7=63.39(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x91.35x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x97.38x0.76x0.7=85.2(75)Northeast $0.9x$ 0.77x2.53x97.38x0.76	Northeast 0.9x	0.77	x	2.5	53	x	4	1.38	x	0.76		×	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 = 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 × 9	Northeast 0.9x	0.77	x	2.5	53	x	4	1.38	x	0.76		×	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 × 0.7 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 67.96 × 0.76 × 0.7 = 63.39 (75) Northeast 0.9x 0.77 × 2.53 × 91.35 × 0.76 × 0.7 = 63.39 (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 × 0.7 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 97.3	Northeast 0.9x	0.77	x	2.5	53	x	4	1.38	x	0.76		×	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 × 91.35 × 0.76 × 0.77 = 85.2 (75) Northeast 0.9x 0.77 × 2.53 × 97.38 × 0.76 × 0.77	Northeast 0.9x	0.77	x	2.5	53	x	6	7.96	x	0.76		×	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 = 63.39 (75) Northeast 0.9x 0.77 x 2.53 x 91.35 x 0.76 x 0.7 = 63.2 (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 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	Northeast 0.9x	0.77	x	2.5	53	x	6	7.96	x	0.76		×	0.7	:	- [63.39	(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 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 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 = 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	Northeast 0.9x	0.77	x	2.5	53	x	6	7.96	x	0.76		×	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 91.1 x 0.76 x 0.77 = 84.97 (75) Northeast 0.9x 0.77 x 2.53 x	Northeast 0.9x	0.77	x	2.5	53	x	6	7.96	x	0.76		×	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 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 x 97.38 x 0.76 x 0.77 = 84.97 (75) Northeast 0.9x 0.77 x 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>9</td><td>1.35</td><td>x</td><td>0.76</td><td></td><td>×</td><td>0.7</td><td>:</td><td>= [</td><td>85.2</td><td>(75)</td></td<>	Northeast 0.9x	0.77	x	2.5	53	x	9	1.35	x	0.76		×	0.7	:	= [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 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 91.1 x 0.76 x 0.77 = 84.97 (75) Northeast 0.9x 0.77 x 2.53 <t< td=""><td>Northeast 0.9x</td><td>0.77</td><td>x</td><td>2.5</td><td>53</td><td>x</td><td>9</td><td>1.35</td><td>x</td><td>0.76</td><td></td><td>×</td><td>0.7</td><td></td><td>- [</td><td>85.2</td><td>(75)</td></t<>	Northeast 0.9x	0.77	x	2.5	53	x	9	1.35	x	0.76		×	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 $=$ 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 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	9	1.35	x	0.76		×	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 $=$ 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 </td <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.5</td> <td>53</td> <td>x</td> <td>9</td> <td>1.35</td> <td>x</td> <td>0.76</td> <td></td> <td>×</td> <td>0.7</td> <td></td> <td>- [</td> <td>85.2</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	9	1.35	x	0.76		×	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>9</td> <td>7.38</td> <td>x</td> <td>0.76</td> <td></td> <td>×</td> <td>0.7</td> <td></td> <td>- [</td> <td>90.84</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.5	53	x	9	7.38	x	0.76		×	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	x	2.5	53	x	9	7.38	x	0.76		×Ē	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	2.5	53	x	9	7.38	x	0.76		×	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	2.5	53	x	9	7.38	x	0.76		×Ī	0.7	-	- Ī	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 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	2.5	53	x	9	91.1	x	0.76		×Ī	0.7	-	- โ	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	2.5	53	x	9	91.1	x	0.76		×Ī	0.7	-	- โ	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	2.5	53	x	ç	91.1	x	0.76		×Ē	0.7		- Ī	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	2.5	53	x	ç	91.1	x	0.76		×Г	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	2.5	53	x	7	2.63	x	0.76		×	0.7		- [67.74	(75)	
	Northeast 0.9x	0.77	x	2.5	53	x	7	2.63	x	0.76		×Г	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	2.5	53	x	7	2.63	x	0.76		×	0.7		- [67.74	(75)	
	Northeast 0.9x	0.77	x	2.5	53	x	7	2.63	x	0.76		× [0.7		- [67.74	(75)	

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0.76

0.7

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50.42

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Nonneast 0.9x	0.77	×	2.53	×	50.42	×	0.76	X	0.7	=	47.03	(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	2.53	x	50.42	x	0.76	x	0.7	=	47.03	(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	2.53	x	28.07	x	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	x	28.07	x	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	x	14.2	x	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	14.2	x	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	14.2	x	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	14.2	x	0.76	x	0.7	=	13.24	(75)
Northeast 0.9x	0.77	x	2.53	x	9.21	x	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)
Northeast 0.9x	0.77	x	2.53	x	9.21	x	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	x	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	x	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	x	106.25		0.76	x	0.7	=	318.08	(79)
Southwest _{0.9x}	0.77	x	3.42	x	106.25		0.76	x	0.7	=	133.97	(79)
Southwest _{0.9x}	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	=	356.28	(79)
Southwest _{0.9x}	0.77	x	3.42	x	119.01		0.76	x	0.7	=	150.06	(79)
Southwest _{0.9x}	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	=	353.7	(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	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	×	5.31	x	104.39		0.76	x	0.7	=	204.36	(79)
Southwest0.9x	0.77	×	8.12	×	104.39		0.76	x	0.7	=	312.51	(79)
Southwest0.9x	0.77	×	3.42	×	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)

Northeast 0.9x

0.77

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47.03

(75)



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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	92.85		0.76	x	0.7	=	117.07	(79)
Southwest _{0.9x}	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		0.76	x	0.7	=	207.36	(79)
Southwest _{0.9x}	0.77	x	3.42	x	69.27		0.76	x	0.7	=	87.34	(79)
Southwest _{0.9x}	0.77	x	5.31	×	44.07		0.76	x	0.7	=	86.28	(79)
Southwest0.9x	0.77	x	8.12	×	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)
Southwest _{0.9x}	0.77	x	5.31	×	31.49		0.76	x	0.7	=	61.64	(79)
Southwest0.9x	0.77	x	8.12	×	31.49		0.76	x	0.7	=	94.26	(79)
Southwest _{0.9x}	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	x	1.27	×	11.28	×	0.76	x	0.7	=	5.28	(81)
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	x	1.27	x	22.97	x	0.76	x	0.7	=	10.75	(81)
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	x	1.27	x	41.38	x	0.76	x	0.7	=	19.37	(81)
Northwest 0.9x	0.77	x	0.69	×	67.96	×	0.76	x	0.7	=	17.29	(81)
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	91.35	x	0.76	x	0.7	=	23.24	(81)
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	x	0.69	x	97.38	×	0.76	x	0.7	=	24.77	(81)
Northwest 0.9x	0.77	x	1.27	x	97.38	×	0.76	x	0.7	=	45.6	(81)
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	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	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	×	0.76	x	0.7	=	7.14	(81)
Northwest 0.9x	0.77	x	1.27	x	28.07	×	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	=	6.65	(81)
Northwest 0.9x	0.77	x	0.69	×	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	×	12.74	×	20.24	×	0.76	x	0.7	=	123.44	(82)
Rooflights 0.9x	1	×	12.74	×	40.55	×	0.76	x	0.7	=	247.33	(82)
Rooflights 0.9x	1	x	12.74	×	74.78	×	0.76	x	0.7	=	456.16	(82)
Rooflights 0.9x	1	x	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)



	_																-
Rooflight		1	x	12.	74	x	18	85.57	x		0.76	×	0.7		=	1131.99	(82)
Rooflight	ts <mark>0.9x</mark>	1	x	12.	74	x	14	42.19	x		0.76	x	0.7		=	867.36	(82)
Rooflight	ts <mark>0.9x</mark>	1	х	12.	74	x	9	3.09	x		0.76	x	0.7		=	567.83	(82)
Rooflight	ts <mark>0.9x</mark>	1	x	12.	74	x	4	9.71	x		0.76	x	0.7		=	303.23	(82)
Rooflight	ts <u>0.9</u> x	1	x	12.	74	x	2	5.27	x		0.76	x	0.7		=	154.14	(82)
Rooflight	ts <u>0.9</u> x	1	x	12.	74	x	1	6.69	x		0.76	_ x [0.7		=	101.83	(82)
									•								-
Solar ga	ains in v	watts, ca	alculated	l for eacl	n month				(83)m	n = Si	um(74)m .	(82)m					
(83)m=	402.26	738.95	1173.16	1756.84	2267.43	23	88.92	2245.34	183	9.3	1369.2	858.54	491.14	338	8.48]	(83)
Total ga	ains – ir	nternal a	nd solar	(84)m =	= (73)m ·	+ (8	33)m	, watts		•			•	•		-	
(84)m=	898.65	1233.08	1649.76	2204.81	2685.2	27	77.82	2616.22	221	7.48	1762.8	1281	946.82	819	9.7]	(84)
7 Mea	n inter	nal temr	erature	(heating	season)				•			•	•		-	
							area f	from Tab	nle 9	Th	1 (°C)					21	(85)
•		-	• •	living are		-				,	· (O)					21	
	Jan	Feb	Mar	Apr	May	È	Jun	Jul	<u>م</u>		Sep	Oct	Nov		ec	1	
(86)m=	Jan 1	0.99	0.94	Арі 0.79	0.56).38	0.28	0.3	ug 34	0.62	0.93	0.99			4	(86)
Ϋ́ L												0.35	0.99			J	(00)
	i	· · ·						ps 3 to 7	<u> </u>							1	
(87)m=	19.71	20	20.41	20.81	20.97		21	21	2	1	20.96	20.63	20.06	19.	.65		(87)
Tempe	erature	during h	eating p	eriods ir	rest of	dw	elling	from Ta	able	9, Tł	n2 (°C)					_	
(88)m=	19.9	19.9	19.9	19.91	19.91	1	9.91	19.91	19.	.91	19.91	19.91	19.91	19.	.91		(88)
Utilisat	ion fac	tor for a	ains for	rest of d	wellina.	h2.	m (se	e Table	9a)							-	
(89)m=	1	0.98	0.93	0.75	0.5	-).32	0.21	0.2	26	0.54	0.9	0.99	1	1]	(89)
L Maan i		40,000,000	oturo in	<u> </u>	ملطبيما	I	TO /6				7 in Tabl		1			1	
_	18.19	18.61	19.19	19.71	19.88	<u> </u>	1∠ (10 9.91	ollow ste	ps 3		19.89	e 9C) 19.51	18.71	18.	11	1	(90)
(90)11-	10.19	10.01	19.19	19.71	19.00	L '	5.51	19.91	13.	.91			$\int_{10.71}^{10.71}$			0.47	(91)
													.g	.,		0.47	
_	r					—		$LA \times T1$	+ (1	– fL	,					1	
(92)m=	18.9	19.25	19.76	20.22	20.39		0.42	20.42		.42	20.39	20.03	19.34	18.	.83		(92)
· · · · ·	<u> </u>				<u> </u>	<u> </u>		m Table	<u> </u>			·	<u> </u>			1	(00)
· ·	18.75	19.1	19.61	20.07	20.24	2	0.27	20.27	20.	.27	20.24	19.88	19.19	18.	.68		(93)
		ting requ			• . •							. —	>				
				nperatur using Ta		ned	at ste	ep 11 of	Tab	le 9b	o, so tha	t Ti,m=(76)m an	d re-	cal	culate	
	Jan	Feb	Mar	Apr	May	Γ	Jun	Jul	Δ	ug	Sep	Oct	Nov		ec	1	
L Utilisat		tor for g			Iviay		Jun	501		uy	Oep	001				1	
(94)m=	0.99	0.98	0.92	0.75	0.52		0.34	0.23	0.2	29	0.56	0.9	0.99	1	1	1	(94)
		hmGm .	W = (94	1)m x (84	4)m								l			J	
	<u> </u>			1661.87	,	94	41.12	611.14	643	3.21	991.85	1148.99	933.64	816	6.75]	(95)
Monthl	v avera	age exte	rnal tem	perature	e from Ta	abl	e 8		I				I			1	
(96)m=	4.3	4.9	6.5	8.9	11.7	1	14.6	16.6	16	.4	14.1	10.6	7.1	4.	2]	(96)
	oss rate	for mea	an intern	al tempe	erature.	L Lm	, W =	L =[(39)m :	x [(9	 3)m-	– (96)m]	<u>I</u>	!		1	
_		2391.13		· · · ·		-	, 44.55	611.56	644	<u> </u>	1024.64	-	2026.75	243	0.87]	(97)
Space	heating	g require	ement fo	r each m	honth, k	Wh	/mont	th = 0.02	24 x	[(97)	m – (95)m] x (4	1)m	•		4	
(98)m=	1146.36	795.42	507.38	150.81	24.51		0	0			0	300.37	787.04	120	0.9]	
	I		•		•	•										-	



								Tota	l per year	(kWh/year	[.]) = Sum(9	8)15,912 =	4912.78	(98)
Space	e heatin	g require	ement in	n kWh/m²	/year								35.66	(99)
9a. Ene	ergy rec	quiremer	nts – Ind	ividual h	eating s	ystems i	ncluding	micro-C	HP)					-
	e heatir	•		_										-
				econdar		mentary	-		(2.2.1)				0	(201)
				nain syst	. ,			(202) = 1 -					1	(202)
			0	main sys				(204) = (20	02) × [1 –	(203)] =			1	(204)
	•			ting syste									90.4	(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	kWh/yea	ır
Space		<u> </u>	i È			1			0	000.07	707.04	1000.0		
	1146.36		507.38	150.81	24.51	0	0	0	0	300.37	787.04	1200.9		
(211)m 	= {[(98 1268.1)m x (20 879.89	<u> </u>	100 ÷ (20 166.82			0	0	0	332.26	070.60	1000 40		(211)
l	1200.1	079.09	561.26	100.02	27.11	0	0	-	l (kWh/yea		870.62	1328.43	5434.5	(211)
Snace	boatin	a fuol (e	ocondar	·y), kWh/	month					,	- 715,1012	2	0404.0	
•)1)]}x1		• /	monun									
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		
•								Tota	l (kWh/yea	ar) =Sum(2	215) _{15,1012}	-	0	(215)
Water	heating	J												-
Output			I I	ulated al		444.00	440.00	400.00	404.44	400.07	405.00	400.04		
Efficier	103.88	98.01 ater hea	116.98	120.74	126.54	114.83	113.39	123.89	124.11	120.07	105.08	100.04	80.3	(216)
(217)m=	89.47	89.17	88.32	85.61	81.78	80.3	80.3	80.3	80.3	87.27	89.08	89.53	00.3	(217)
` ´		heating,			00		0010	00.0	0010	01121		00100	1	. ,
		<u>m x 100</u>				1					1	I	L	
(219)m=	116.11	109.92	132.46	141.03	154.73	143.01	141.2	154.29	154.55	137.59	117.96	111.74		-
								lota	I = Sum(2 ⁻		,		1614.58	(219)
	I totals		ed main	system	1					k	Wh/year	•	kWh/year 5434.5	1
•	-			oyotom] T
	•	fuel use											1614.58	
				electric	keep-ho	t								
centra	I heatir	ig pump	:									30		(230c)
boiler	with a f	an-assis	sted flue									45		(230e)
Total e	lectricity	y for the	above,	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
Electric	ity for li	ighting											483.11	(232)
12a. (CO2 em	issions ·	– Individ	lual heati	ng syste	ems inclu	uding mi	cro-CHP)					-
						En	orav			Emico	ion fac	tor	Emissions	
							ergy /h/year			kg CO			kg CO2/yea	r
Space	heating	(main s	ystem 1)		(211	1) x			0.2	16	=	1173.85	(261)



Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	348.75	(264)
Space and water heating	(261) + (262) + (263) + ((264) =		1522.6	(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) =		1812.26	(272)
Dwelling CO2 Emission Rate		(272) ÷ (4) =		13.16	(273)
El rating (section 14)				87	(274)



						User	Details:						
Assessor I	Name:	Pe	ter Mitch	nell			Stron	na Num	ber:		STRO	007945	
Software N			oma FS		2			are Vei				on: 1.0.3.15	
					P	roperty	/ Address	s: Unit 1 ((GF&FF	END) C	LEAN		
Address :		Nev	<i>w</i> Dwellir	ng at:, G	ordon H	ouse, (6 Lissend	len Garde	ens, LOI	NDON, N	NW5 1LX	<	
1. Overall dw	velling dir	mension	s:										
						Ar	ea(m²)		Av. He	ight(m)	_	Volume(m ³))
Ground floor							73.62	(1a) x	2	2.4	(2a) =	176.69	(3a)
First floor							64.14	(1b) x	3	8.32	(2b) =	212.94	(3b)
Total floor are	a TFA =	(1a)+(1l	o)+(1c)+((1d)+(1e	e)+(1n)	137.76	(4)					
Dwelling volu	me							(3a)+(3b)+(3c)+(3c	d)+(3e)+	.(3n) =	389.63	(5)
2. Ventilation	rate:												_
			main heating		econdar neating	У	other		total			m ³ per hou	٢
Number of ch	imneys		0	+	0	+	0	=	0	X	40 =	0	(6a)
Number of op	en flues	Г	0	7 + [0] + [0] = [0	x	20 =	0	(6b)
Number of inte	ermittent	fans							4	x .	10 =	40	(7a)
Number of pa	ssive ver	nts						Ē	0	x .	10 =	0	(7b)
Number of flu	eless gas	s fires						Γ	0	x	40 =	0	(7c)
													-
				(0		\ (- 1 \)		-				hanges per ho	_
Infiltration due								continuo fr	40		÷ (5) =	0.1	(8)
Number of s					eu, proceet	10(17)	, ourierwise	continue ii	011 (9) 10 ((70)		0	(9)
Additional in	•		olinig (ile	•)						[(9)	-1]x0.1 =	0	(10)
Structural ir			r steel or	timber	frame or	0.35 f	or masor	ry constr	uction			0	(11)
if both type:								•				Ŭ	
deducting a													-
If suspende				•	led) or 0.	1 (sea	led), else	enter 0				0	(12)
If no draugh												0	(13)
Percentage		ows and	doors ar	aught si	tripped		0.05 10	2 x (14) ÷ 1	001			0	(14)
Window infi								2 × (14) ÷ 1) + (11) + (1	-	(15) -		0	(15)
Infiltration ra				المراجع الم								0	(16)
Air permeal	•	•	•			•	•	•	etre of e	envelope	area	5	(17)
If based on ai Air permeabilit	•	•							is boing u	sod		0.35	(18)
Number of sic			essunsauc		s been don	eorau	egree an p	enneability	is being u	seu		3	(19)
Shelter factor							(20) = 1 ·	· [0.075 x (1	19)] =			0.78	(10)
Infiltration rate	e incorpo	rating sh	nelter fac	tor			(21) = (1	8) x (20) =				0.27	(21)
Infiltration rate	e modifie	d for mo	nthly win	nd speed	b								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly avera	age wind	speed fi	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 of	or positiv	/e input \	/entilatic	n from c	outside				1	
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) =



Heat c	apacity	Cm = S((Axk)						((28)	(32e) =	0	(34)		
Therm	al mass	parame	eter (TMF	- Cm -	÷ TFA) ir	n kJ/m²K	,		Indica		250	(35)		
	•		ere the de tailed calci		e constructi	ion are noi	t known pr	ecisely the	indicative	e values of	TMP in Ta	able 1f		
Therm	al bridge	es : S (L	x Y) cal	culated	using Ap	pendix l	K						6.8	(36)
			are not kn	own (36) =	= 0.15 x (3	1)			(22)	(20)				
	abric he		alaulataa	Imanthi	.,					(36) =	2E) m v (E)		86.64	(37)
venua		Feb	alculated	i		lun		Aug		i	25)m x (5)	_	1	
(38)m=	Jan 72.1	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)
				10.1	00.01	00.02	00.02	00.1				10.02	J	()
Heat ti (39)m=	158.73	158.43	158.13	156.74	156.47	155.26	155.26	155.03	(39)m 155.73	= (37) + (156.47	38)m 157	157.56	1	
(39)11=	156.73	156.43	156.13	150.74	150.47	155.20	155.20	155.03			Sum(39)1		156.73	(39)
Heat lo	oss para	ameter (H	HLP), W/	′m²K						= (39)m ÷			100.70	(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 mo	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 ene	rgy requi	irement:								kWh/y	ear:	
if TF	A > 13.9	9, N = 1		[1 - exp	0(-0.0003	849 x (TF	FA -13.9)2)] + 0.(0013 x (⁻	TFA -13		91]	(42)
if TF if TF Annua <i>Reduce</i>	A > 13.9 A £ 13.9 I averag	9, N = 1 9, N = 1 ge hot wa al average		ge in litre usage by	es per da 5% if the a	ay Vd,av Iwelling is	erage = designed t	(25 x N)	+ 36		.9)	91 3.38]	(42) (43)
if TF if TF Annua <i>Reduce</i>	A > 13.9 A £ 13.9 I averag the annua e that 125	9, N = 1 9, N = 1 ge hot wa al average f litres per p	+ 1.76 x ater usag hot water person per	ge in litre usage by ^r day (all w	es per da 5% if the o vater use, l	ay Vd,av Iwelling is hot and co	erage = designed t ld)	(25 x N) to achieve	+ 36 a water us	se target o	.9) 10; r	3.38]]	
if TF if TF Annua Reduce not more	A > 13.9 A £ 13.9 I averag the annua e that 125	9, N = 1 9, N = 1 9e hot wa al average i litres per j Feb	+ 1.76 x ater usag hot water	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 hot and co Jun	erage = designed i ld) Jul	(25 x N) to achieve Aug	+ 36		.9)]]]	
if TF if TF Annua Reduce not more	A > 13.9 A £ 13.9 I averag the annua e that 125	9, N = 1 9, N = 1 9e hot wa al average i litres per j Feb	+ 1.76 x ater usag hot water person 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 hot and co Jun	erage = designed i ld) Jul	(25 x N) to achieve Aug	+ 36 a water us	se target o	.9) 10; r	3.38]]]	
if TF if TF Annua Reduce not more Hot wate (44)m=	A > 13.9 $A \pm 13.9$ I averag the annual the annual the that 125 Jan er usage in 113.71	9, N = 1 9, N = 1 ge hot wa al average litres per Feb n litres per 109.58	+ 1.76 x ater usag hot water person per Mar r day for ea	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 Iwelling is hot and co Jun ctor from 1 93.04	erage = $designed a$ ld) Jul Table 1c x 93.04	(25 x N) to achieve Aug (43) 97.17	+ 36 a water us Sep 101.31	Oct 105.44	9) 10: 10: 109.58 m(44)112 =	3.38 Dec 113.71	1240.5	(43)
if TF if TF Annua Reduce not more Hot wate (44)m=	A > 13.9 $A \pm 13.9$ I averag the annual the annual the that 125 Jan er usage in 113.71	9, N = 1 9, N = 1 ge hot wa al average litres per Feb n litres per 109.58	+ 1.76 x ater usag hot water person per Mar r 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 Iwelling is hot and co Jun ctor from 1 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 105.44	9) 10: 10: 109.58 m(44)112 =	3.38 Dec 113.71]] 1240.53	(43)
if TF if TF Annua Reduce not more Hot wate (44)m= Energy (45)m=	A > 13.9 $A \pm 13.9$ I averag the annual the an	9, N = 1 9, N = 1 ge hot wa al average i litres per Feb n litres per 109.58 i hot water 147.49	+ 1.76 x 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 culated me 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 hot and co Jun ctor from T 93.04 190 x Vd,r 109.86	erage = designed i ld) Jul Table 1c x 93.04 $m \times nm \times D$ 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	9) 10: 109.58 m(44)112 ables 1b, 1	3.38 Dec 113.71 = c, 1d) 163.31]] 	(43) 2(44)
if TF if TF Annua Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m=	A > 13.9 $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 125$ Jan ar usage in 113.71 content of 168.63 taneous w 25.3	9, N = 1 9, N = 1 ge hot wa al average i litres per Feb n litres per 109.58 hot water 147.49 water heatil 22.12	+ 1.76 x 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 me 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 hot and co Jun ctor from T 93.04 190 x Vd,r 109.86	erage = designed i ld) Jul Table 1c x 93.04 $m \times nm \times D$ 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	9) 10: 10: 10: 10: 10: 10: 10: 10:	3.38 Dec 113.71 = c, 1d) 163.31		(43) 2(44)
if TF if TF Annua Reduce not more (44)m= Energy (45)m= If instan (46)m= Water	A > 13.9 $A \pm 13.9$ $A \pm 13.9$ I averag the annual taneous with $168.63taneous with25.3storage$	9, N = 1 9, N = 1 ge hot wa al average litres per Feb n litres per 109.58 hot water 147.49 vater heati 22.12 loss:	+ 1.76 x ater usag hot water person per Mar 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 me 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 19.1	ay Vd,av Iwelling is hot and co Jun ctor from 1 93.04 190 x Vd,r 109.86 storage), 16.48	erage = designed t ld) Table 1c x 93.04 $n \times nm \times D$ 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	9) 10: 109.58 m(44)112 = ables 1b, 1 150.39 m(45)112 = 22.56	3.38 Dec 113.71 <i>c, 1d)</i> 163.31 24.5		(43) 2 (44) 2 (45) (46)
if TF if TF Annua Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m= Water Storag	A > 13.9 $A \pm 13.9$ $A \pm 13.9$ I averag the annual the an	9, N = 1 9, N = 1 9, N = 1 19 hot was al average i litres per Feb n litres per 109.58 109.58 thot water 147.49 water heatin 22.12 loss: ne (litres)	+ 1.76 x ater usag hot water person per Mar 105.44 used - cal 152.2 ng at point 22.83) includir	ge in litre usage by day (all w Apr ach month 101.31 culated me 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 19.1 olar or W	ay Vd,av Iwelling is hot and co Jun ctor from 7 93.04 190 x Vd,r 109.86 storage), 16.48 /WHRS	erage = designed i ld) Jul Table 1c x 93.04 m x nm x E 101.81 enter 0 in 15.27 storage	(25 x N) to achieve Aug (43) 97.17 97.17 07m / 3600 116.82 boxes (46) 17.52 within sa	+ 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	9) 10: 109.58 m(44)112 = ables 1b, 1 150.39 m(45)112 = 22.56	3.38 Dec 113.71 = c, 1d) 163.31 =		(43) 2 (44) 2 (45)
if TF if TF Annua Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m= Water Storag If comm Otherv	A > 13.9 $A \pm 13.9$ $A \pm 13.9$ I averag the annual e that 125 Jan er usage in 113.71 content of 168.63 taneous w 25.3 storage we volum munity h vise if no	9, N = 1 9, N = 1 9, N = 1 ge hot wa al average litres per p Feb n litres per 109.58 thot water 147.49 vater heatin 22.12 loss: ne (litres) neating a p stored	+ 1.76 x ater usag hot water person per Mar 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 me 132.69 f of use (no 19.9 ng any se ank 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 olar or W velling, e	ay Vd,av Iwelling is hot 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 $m \times nm \times D$ 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	Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	9) 10:58 m(44)112 ables 1b, 1 150.39 m(45)112 22.56	3.38 Dec 113.71 <i>c, 1d)</i> 163.31 24.5		(43) 2 (44) 2 (45) (46)
if TF if TF Annua Reduce not more Hot wate (44)m= (44)m= (45)m= If instan (46)m= Water Storag If comu Otherv Water	A > 13.9 $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 13.9$ $A \pm 125$ a = usage in $a = usage ina = usage ina = 125.3a = 168.63a = 168.63$	9, N = 1 9, N = 1 9, N = 1 9, N = 1 19, N = 1 10,	+ 1.76 x 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 ng any se ank in dw er (this in	es per da 5% if the o vater use, I May Vd,m = fac 97.17 onthly = 4. 127.32 o hot water 19.1 olar or W velling, e ncludes i	ay Vd,av Iwelling is hot 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 m x nm x 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	Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	9) 10:58 m(44) 112 = ables 1b, 1 150.39 m(45) 112 = 22.56 47)	3.38 Dec 113.71 c, 1d) 163.31 24.5 0		(43) 2 (44) 2 (45) (46) (47)
if TF if TF Annua Reduce not more Hot wate (44)m= Energy (45)m= If instan (46)m= Water Storag If com Otherv Water a) If m	A > 13.9 $A \pm 13.9$ $A \pm 13.9$ I averag the annual e that 125 Jan er usage in 113.71 content of 168.63 taneous w 25.3 storage ne volum munity h vise if no storage hanufact	9, N = 1 9, N = 1 9, N = 1 19, N = 1 10, N = 1 10	+ 1.76 x 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 hot wate eclared la	ge in litre usage by day (all w Apr ach month 101.31 culated mo 132.69 f of use (no 19.9 ng any so ank in dw er (this ir	es per da 5% if the o vater use, I May Vd,m = fac 97.17 onthly = 4. 127.32 o hot water 19.1 olar or W velling, e ncludes i	ay Vd,av Iwelling is hot 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 m x nm x 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	Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	9) 10: 109.58 m(44) ₁₁₂ = ables 1b, 1 150.39 m(45) ₁₁₂ = 22.56 22.56	3.38 Dec 113.71 <i>c, 1d)</i> 163.31 24.5 0		(43) 2 (44) 2 (45) (46) (47) (48)
if TF if TF Annua <i>Reduce</i> <i>not more</i> <i>Hot wate</i> (44)m= <i>Energy</i> (45)m= <i>If instan</i> (46)m= Water Storag If comit Otherv Water a) If m Tempe	A > 13.9 $A \ge 13.9$ $A \pounds 13.9$ I averag the annual the annual the annual the annual the annual taneous with $113.71content of168.63taneous with25.3storagewith vise if nostoragehanufacterature factors$	9, N = 1 9, N = 1 109.58 7, N = 1 109.57 100.57 100	+ 1.76 x 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 f of use (no 19.9 ng any so ank in dw er (this ir oss facto 2b	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 or is know	ay Vd,av Iwelling is hot and co Jun ctor from 7 93.04 190 x Vd,r 109.86 storage), 16.48 /WHRS nter 110 nstantar	erage = designed i d Jul Table 1c x 93.04 m x nm x D 101.81 enter 0 in 15.27 storage) litres in neous co n/day):	(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 vess ers) ente	Oct 105.44 Total = Su 137.77 Total = Su 20.67 sel	9) 10: 109.58 m(44) 112 = ables 1b, 1 150.39 m(45) 112 = 22.56 47)	3.38 Dec 113.71 c, 1d) 163.31 24.5 0		(43) 2 (44) 2 (45) (46) (47)



If comr	nunity h	age loss leating s from Tal	ee secti		le 2 (kWl	h/litre/da	ıy)				г	0		(51) (52)
		actor fro		2b								0		(52)
Energy	v lost fro	m water	storage	, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(54)
•••		(54) in (5	-	, .,						,		0		(55)
Water	storage	loss cal	culated f	for each	month			((56)m = (55) × (41)ı	m				
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0		(56)
	er contains	s dedicate	d solar sto	rage, (57)	I m = (56)m	x [(50) – (L H11)] ÷ (5	0), else (5	7)m = (56)	n where (L 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 (an	nual) fro	u m Table	3							0		(58)
	•	•	,		month (59)m = ((58) ÷ 36	35 x (41)	m			•		()
	•				here is s	,	. ,	• • •		r thermo	stat)			
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss cal	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 regi	uired for	water h	eating ca	alculated	l for eac	h month	(62)m =	0.85 x ((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	(00)	(62)
` ´		l calculated	L usina App	L endix G or	I Appendix		L	I /) (enter '0	if no sola	I r contributi	L	r heating)		
	Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating) (add additional lines if FGHRS and/or WWHRS applies, see Appendix G)													
` (63)m=	0	0	0	0	0	0	0	0	0	0	0	0		(63)
FHRS	0	0	0	0	0	0	0	0	0	0	0	0		(63) (G2)
WWHRS	0	0	0	0	0	0	0	0	0	0	0	0		(63) (G10)
Output	from wa	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		
			I	I	1	I	I	Outp	out from wa	ater heate	ı r (annual)₁	12	2216.65	(64)
Heat g	ains froi	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	de (57)ı	m in calo	ulation (u of (65)m	only if c	vlinder i	s in the o	dwelling	or hot w	ater is fr	om com	munity h	eating	
	. ,	ains (see		. ,	•	,		5				,	J	
	Ŭ	s (Table			/-									
Mictabl	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	a aains	(calcula	ted in Ar	pendix	L, equati	ion L9 o	r L9a), a	lso see ⁻	Table 5	I				
(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)
	nces dai	ins (calc	ulated in	Append	l dix L, eq	uation L	13 or L1	i 3a), also	see Tal	l 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)
					L, equat				e Table					
(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)
		ns gains											l	
(70)m=	3	3	3	3	3	3	3	3	3	3	3	3		(70)
					es) (Tab				-		_	-		
	-116.51	· ·	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51	-116.51		(71)
···/···-	110.01								. 10.01					



(72)m 92.49 80.1 85.14 78.4 73.54 66.67 61.43 68.85 71.72 78.7 86.67 90.11 (72) Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m (73)m 469.38 494.12 476.6 447.98 417.78 38.9 370.88 393.81 422.47 456.68 491.23 (73) General colspan="4">(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m Solar gains are calculated using solar flux from Table 6a and associated equations to corvert to the applicable orientation. Orientation: Access Factor Area PLux Table 6a 9.7 FLux 0.63 × 0.77 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.7 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.7 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 </th <th>Water heating</th> <th>gains (Ta</th> <th>able 5)</th> <th></th>	Water heating	gains (Ta	able 5)														
(73)me 496.30 494.12 476.6 447.96 417.76 386.9 370.88 378.18 393.61 422.47 455.68 481.22 (73) Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation. Orientation: Access Factor Area Table 6a 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.9x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.9x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.9x 0.77 x 2.09 x 12.8 0.63 x 0.7 = 14.67 (75) Northeast 0.9x 0.77 x 2.09 x 22.97 x 0.63 x 0.7 = 14.67 (75) Northeast 0.9x 0.77 x 2.09 x <td>(72)m= 92.49</td> <td>90.1</td> <td>85.14</td> <td>78.4</td> <td>73.54</td> <td>6</td> <td>6.67</td> <td>61.43</td> <td>68.</td> <td>85</td> <td>71.72</td> <td>78.7</td> <td>86.57</td> <td>90.11</td> <td></td> <td></td> <td>(72)</td>	(72)m= 92.49	90.1	85.14	78.4	73.54	6	6.67	61.43	68.	85	71.72	78.7	86.57	90.11			(72)
6. Solar gains: Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation. Orientation: Access Factor m ² Flux g_ FF Gains Northeast 0.5v 0.77 x 2.09 x 11.28 x 0.63 x 0.7 = 7.21 (75) Northeast 0.5v 0.77 x 2.09 x 11.28 x 0.63 x 0.7 = 7.21 (75) Northeast 0.5v 0.77 x 2.09 x 11.28 x 0.63 x 0.7 = 7.21 (75) Northeast 0.5v 0.77 x 2.09 x 2.297 x 0.63 x 0.7 = 14.67 (75) Northeast 0.5v 0.77 x 2.09 x 2.97 0.63 x 0.7 = 26.43 (75) Northeast 0.5v 0.77 x 2.09 x 1.38 0.63<	Total interna	l gains =				-	(66)m + (67)m	1 + (68	3)m + ((69)m + (7	70)m +	(71)m + (72)	m			
Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation: Cyrientation: Access Factor Area Flux Table 6a Northeast Op Table 7 Gains (W) Northeast 0.9 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 24.643 (75) Northeast 0.9 0.77 × 2.09 × 41.38 No63	(73)m= 496.38	494.12	476.6	447.98	417.78	3	888.9	370.88	378	.18	393.61	422.4	7 455.68	481.2	3		(73)
Orientation: Access Factor Table 6d Area m ² Flux Table 6a g_ FF Gains (W) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75)	6. Solar gains:							-									
Table 6d m ² Table 6a Table 6b Table 6c (W) Northeast 0.9x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.9x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.9x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.9x 0.77 x 2.09 x 2.22.97 x 0.63 x 0.77 = 14.67 (75) Northeast 0.9x 0.77 x 2.09 x 2.297 x 0.63 x 0.77 = 14.67 (75) Northeast 0.9x 0.77 x 2.09 x 1.138 x 0.63 x 0.77 = 2.64.3 (75) Northeast 0.9x 0.77	Solar gains are	calculated u	ising sola	r flux from	Table 6a	and	assoc	iated equa	tions	to conv	vert to the	e applic	able orientat	ion.			
Northeast 0.5x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.5x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.5x 0.77 x 2.09 x 11.28 x 0.63 x 0.77 = 7.21 (75) Northeast 0.5x 0.77 x 2.09 x 22.97 x 0.63 x 0.77 = 14.67 (75) Northeast 0.5x 0.77 x 2.09 x 22.97 x 0.63 x 0.7 = 14.67 (75) Northeast 0.5x 0.77 x 2.09 x 22.97 x 0.63 x 0.7 = 2.64.3 (75) Northeast 0.5x 0.77 x 2.09 x 41.38 x 0.63 x 0.7 <			actor		l												
Northeast 0.9X 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9X 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9X 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9X 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9X 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9X 0.77 × 2.09 × 14.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9X 0.77 × 2.09 × 14.38 × 0.63 × 0.77		Table 6d		m²			la	ble 6a		la	ble 6b		Table 6c			(VV)	
Northeast 0.5x 0.77 × 2.09 × 11.28 × 0.63 × 0.7 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.7 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.7 = 11.4.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.7 = 11.4.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.7 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.7 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.7 <	Northeast 0.9x	0.77	x	2.	09	x	1	11.28	x		0.63	x	0.7	-	-	7.21	(75)
Northeast 0.9x 0.77 × 2.09 × 11.28 × 0.63 × 0.77 = 7.21 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 <t< td=""><td>Northeast 0.9x</td><td>0.77</td><td>x</td><td>2.</td><td>09</td><td>x</td><td>1</td><td>11.28</td><td>x</td><td></td><td>0.63</td><td>×</td><td>0.7</td><td></td><td>-</td><td>7.21</td><td>(75)</td></t<>	Northeast 0.9x	0.77	x	2.	09	x	1	11.28	x		0.63	×	0.7		-	7.21	(75)
Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.7 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.7 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9x 0.77 × 2.09 × 14.87 (76) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 <td< td=""><td>Northeast 0.9x</td><td>0.77</td><td>x</td><td>2.</td><td>09</td><td>x</td><td>1</td><td>11.28</td><td>x</td><td></td><td>0.63</td><td>x</td><td>0.7</td><td>-</td><td></td><td>7.21</td><td>(75)</td></td<>	Northeast 0.9x	0.77	x	2.	09	x	1	11.28	x		0.63	x	0.7	-		7.21	(75)
Northeast 0.94 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.94 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.94 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.94 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.94 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.94 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 26.43 (75) Northeast 0.94 0.77 × 2.09 <	Northeast 0.9x	0.77	x	2.	09	x	1	11.28	x		0.63	×	0.7	=	-	7.21	(75)
Northeast 0.9× 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9× 0.77 × 2.09 × 22.97 × 0.63 × 0.77 = 14.67 (75) Northeast 0.9× 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9× 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9× 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9× 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9× 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9× 0.77 × 2.09	Northeast 0.9x	0.77	x	2.	09	x	2	22.97	x		0.63	×	0.7	=	-	14.67	(75)
Northeast 0.9x 0.77 x 2.09 x 22.97 x 0.63 x 0.77 = 14.67 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 2.6.43 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 2.6.43 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 2.6.43 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 2.6.43 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.77 = 2.6.43 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.77 = 43.41 (75) Northeast 0.9x 0.77 x 2.09	Northeast 0.9x	0.77	x	2.	09	x	2	22.97	x		0.63	×	0.7	=	-	14.67	(75)
Northeast 0.077 × 2.09 × 41.38 × 0.63 × 0.77 = 2.643 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 2.643 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 2.643 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 2.643 (75) Northeast 0.9x 0.77 × 2.09 × 667.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × <t< td=""><td>Northeast 0.9x</td><td>0.77</td><td>x</td><td>2.</td><td>09</td><td>x</td><td>2</td><td>22.97</td><td>x</td><td></td><td>0.63</td><td>×</td><td>0.7</td><td>=</td><td>-</td><td>14.67</td><td>(75)</td></t<>	Northeast 0.9x	0.77	x	2.	09	x	2	22.97	x		0.63	×	0.7	=	-	14.67	(75)
Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 26.43 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 26.43 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 26.43 (75) Northeast 0.9x 0.77 x 2.09 x 41.38 x 0.63 x 0.77 = 26.43 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.77 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.77 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.77 = 63.35 (75) Northeast 0.9x 0.77 x 2.09	Northeast 0.9x	0.77	x	2.	09	x	2	22.97	x		0.63	×	0.7	=	- [14.67	(75)
Northeast 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 1.35 × 0.63 × 0.77 = 58.35 (75) Northeast 0.9x 0.77 × 2.09 × 9	Northeast 0.9x	0.77	x	2.	09	x	4	41.38	x		0.63	×	0.7	-	-	26.43	(75)
Northeast 0.9x 0.77 × 2.09 × 41.38 × 0.63 × 0.77 = 26.43 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 67.96 × 0.63 × 0.77 = 43.41 (75) Northeast 0.9x 0.77 × 2.09 × 91.35 × 0.63 × 0.77 = 58.35 (75) Northeast 0.9x 0.77 × 2.09	Northeast 0.9x	0.77	x	2.	09	x	4	41.38	x		0.63	x	0.7	-	-	26.43	(75)
Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x </td <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.</td> <td>09</td> <td>x</td> <td>4</td> <td>41.38</td> <td>x</td> <td></td> <td>0.63</td> <td>x</td> <td>0.7</td> <td>-</td> <td>- [</td> <td>26.43</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.	09	x	4	41.38	x		0.63	x	0.7	-	- [26.43	(75)
Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x </td <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.</td> <td>09</td> <td>x</td> <td>4</td> <td>41.38</td> <td>x</td> <td></td> <td>0.63</td> <td>×</td> <td>0.7</td> <td>=</td> <td>- [</td> <td>26.43</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.	09	x	4	41.38	x		0.63	×	0.7	=	- [26.43	(75)
Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.</td> <td>09</td> <td>x</td> <td>6</td> <td>67.96</td> <td>x</td> <td></td> <td>0.63</td> <td>×</td> <td>0.7</td> <td>=</td> <td>- [</td> <td>43.41</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.	09	x	6	67.96	x		0.63	×	0.7	=	- [43.41	(75)
Northeast 0.9x 0.77 x 2.09 x 67.96 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 43.41 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x <td>Northeast 0.9x</td> <td>0.77</td> <td>x</td> <td>2.</td> <td>09</td> <td>x</td> <td>6</td> <td>67.96</td> <td>x</td> <td></td> <td>0.63</td> <td>×</td> <td>0.7</td> <td>=</td> <td>- [</td> <td>43.41</td> <td>(75)</td>	Northeast 0.9x	0.77	x	2.	09	x	6	67.96	x		0.63	×	0.7	=	- [43.41	(75)
Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x <td>Northeast 0.9x</td> <td>0.77</td> <td>×</td> <td>2.</td> <td>09</td> <td>x</td> <td>6</td> <td>67.96</td> <td>x</td> <td></td> <td>0.63</td> <td>×</td> <td>0.7</td> <td>-</td> <td>- Г</td> <td>43.41</td> <td>(75)</td>	Northeast 0.9x	0.77	×	2.	09	x	6	67.96	x		0.63	×	0.7	-	- Г	43.41	(75)
Northeast $0.9x$ 0.77 x 2.09 x 91.35 x 0.63 x 0.7 $=$ 58.35 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.35 x 0.63 x 0.7 $=$ 58.35 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.35 x 0.63 x 0.7 $=$ 58.35 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.35 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75) Northeast $0.9x$ 0.77	Northeast 0.9x	0.77	x	2.	09	x	6	67.96	x		0.63	×	0.7	=	- [43.41	(75)
Northeast $0.9x$ 0.77 x 2.09 x 91.35 x 0.63 x 0.7 $=$ 58.35 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.35 x 0.63 x 0.7 $=$ 58.35 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x	Ş	91.35	x		0.63	×	0.7	=	- [58.35	(75)
Northeast 0.9x 0.77 x 2.09 x 91.35 x 0.63 x 0.7 = 58.35 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast 0.9x 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 58.19 (75) Northeast 0.9x 0.77 x 2.09 x	Northeast 0.9x	0.77	×	2.	09	x	9	91.35	x		0.63	×	0.7	-	٠Ē	58.35	(75)
Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 $=$ 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 $=$ 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x	9	91.35	x		0.63	×	0.7	=	- [58.35	(75)
Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75)	Northeast 0.9x	0.77	×	2.	09	x	ę	91.35	x		0.63	×	0.7		- Г	58.35	(75)
Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x	9	97.38	x		0.63	×	0.7	-	٠Ē	62.2	(75)
Northeast $0.9x$ 0.77 x 2.09 x 97.38 x 0.63 x 0.7 = 62.2 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x		97.38	x		0.63	×	0.7	-	- Г	62.2	(75)
Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast $0.9x$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x		97.38	x		0.63	×	0.7	-	- Г	62.2	(75)
Northeast 0.9x 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75) Northeast 0.9x 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x		97.38	x		0.63	×	0.7		- Г	62.2	(75)
Northeast $_{0.9x}$ 0.77 x 2.09 x 91.1 x 0.63 x 0.7 = 58.19 (75)	Northeast 0.9x	0.77	x	2.	09	x		91.1	x		0.63	×	0.7		- Г	58.19	(75)
	Northeast 0.9x	0.77	x	2.	09	x		91.1	x		0.63	×	0.7		- Г	58.19	(75)
	Northeast 0.9x	0.77	x	2.	09	x		91.1	x		0.63	×	0.7		- Г	58.19	(75)
Northeast 0.9x 0.77 X 2.09 X 91.1 X 0.63 X 0.7 = 58.19 (75)	Northeast 0.9x		×	2.	09	x		91.1	x		0.63	x	0.7		- [58.19	(75)
Northeast 0.9x 0.77 x 2.09 x 72.63 x 0.63 x 0.77 = 46.39 (75)	Northeast 0.9x	0.77	×	2.	09	x	7	72.63	x		0.63	x	0.7	-	- Г	46.39	(75)
Northeast 0.9x 0.77 x 2.09 x 72.63 x 0.63 x 0.77 = 46.39 (75)	Northeast 0.9x	0.77	×	2.	09	x	7	72.63	x		0.63	x	0.7	=	-	46.39	(75)
Northeast 0.9x 0.77 x 2.09 x 72.63 x 0.63 x 0.77 = 46.39 (75)	Northeast 0.9x	0.77	×	2.	09	x	7	72.63	x		0.63	x	0.7	=	- Г	46.39	(75)
Northeast 0.9x 0.77 x 2.09 x 72.63 x 0.63 x 0.77 = 46.39 (75)	Northeast 0.9x	0.77	×	2.	09	x			x		0.63	x	0.7		- [46.39	(75)



		1		1				1		1		-
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	×	2.09	X	50.42	X	0.63	X	0.7] =	32.21	(75)
Northeast 0.9x	0.77	×	2.09	X	50.42	X	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	×	2.09	X	28.07	x	0.63	X	0.7	=	17.93	(75)
Northeast 0.9x	0.77	×	2.09	X	28.07	x	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	=	17.93	(75)
Northeast 0.9x	0.77	x	2.09	x	28.07	x	0.63	x	0.7	=	17.93	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	x	0.63	x	0.7	=	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	x	0.63	x	0.7	=	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	x	0.63	x	0.7	=	9.07	(75)
Northeast 0.9x	0.77	x	2.09	x	14.2	x	0.63	x	0.7	=	9.07	(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	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)
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)
Southwest0.9x	0.77	x	6.71	x	119.01		0.63	x	0.7] =	244.05	(79)
Southwest _{0.9x}	0.77	x	2.83	x	119.01		0.63	x	0.7	=	102.93	(79)
Southwest _{0.9x}	0.77	x	4.39	x	118.15		0.63	x	0.7	=	158.51	(79)
Southwest0.9x	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)
Southwest _{0.9x}	0.77	x	6.71	×	113.91		0.63	x	0.7] =	233.59	(79)
Southwest _{0.9x}	0.77	x	2.83	×	113.91		0.63	x	0.7] =	98.52	(79)
Southwest _{0.9x}	0.77	x	4.39	x	104.39		0.63	x	0.7	=	140.05	(79)
Southwest _{0.9x}	0.77	x	6.71	×	104.39		0.63	x	0.7] =	214.07	(79)
Southwest _{0.9x}	0.77	x	2.83	×	104.39		0.63	x	0.7] =	90.29	(79)
Southwest _{0.9x}	0.77	×	4.39	×	92.85		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)
Southwest _{0.9x}	0.77] x	2.83	x	92.85		0.63	x	0.7	=	80.31](79)
Southwest _{0.9x}	0.77	x	4.39	x	69.27		0.63	x	0.7	=	92.93	(79)
Southwest _{0.9x}	0.77	x	6.71	x	69.27		0.63	x	0.7	=	142.04	(79)
Southwest _{0.9x}	0.77	x	2.83	x	69.27		0.63	x	0.7	=	59.91	(79)
Southwest _{0.9x}	0.77	x	4.39	x	44.07	ĺ	0.63	x	0.7	=	59.13	(79)
Southwest0.9x	0.77	x	6.71	x	44.07		0.63	x	0.7	=	90.37	(79)
Southwest _{0.9x}	0.77	x	2.83	x	44.07		0.63	x	0.7	=	38.12	(79)
Southwest0.9x	0.77	x	4.39	x	31.49		0.63	x	0.7	=	42.25	(79)
Southwest0.9x	0.77	x	6.71	x	31.49		0.63	x	0.7	=	64.57	(79)
Southwest0.9x	0.77	x	2.83	x	31.49		0.63	x	0.7	=	27.23	(79)
Northwest 0.9x	0.77	x	0.57	x	11.28	x	0.63	x	0.7	=	1.97	(81)
Northwest 0.9x	0.77	x	1.05	x	11.28	x	0.63	x	0.7	=	3.62	(81)
Northwest 0.9x	0.77	x	0.57	×	22.97	x	0.63	x	0.7	=	4	(81)
Northwest 0.9x	0.77	x	1.05	x	22.97	x	0.63	x	0.7	=	7.37	(81)
Northwest 0.9x	0.77	x	0.57	x	41.38	x	0.63	x	0.7	=	7.21	(81)
Northwest 0.9x	0.77	x	1.05	×	41.38	x	0.63	x	0.7	=	13.28	(81)
Northwest 0.9x	0.77	x	0.57	x	67.96	x	0.63	x	0.7	=	11.84	(81)
Northwest 0.9x	0.77	x	1.05	x	67.96	x	0.63	x	0.7	=	21.81	(81)
Northwest 0.9x	0.77	×	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	×	0.7	=	31.25	(81)
Northwest 0.9x	0.77	×	0.57	x	91.1	x	0.63	x	0.7	=	15.87	(81)
Northwest 0.9x	0.77	×	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	×	1.05	X	72.63	X	0.63	X	0.7	=	23.31	(81)
Northwest 0.9x	0.77	X	0.57	X	50.42	X	0.63	X	0.7	=	8.78	(81)
Northwest 0.9x	0.77	×	1.05	X	50.42	X	0.63	X	0.7	=	16.18	(81)
Northwest 0.9x	0.77	X	0.57	X	28.07	X	0.63	X	0.7	=	4.89	(81)
Northwest 0.9x	0.77	X	1.05	X	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	X	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	X	10.53	X	20.24	X	0.63	X	0.7	=	84.57	(82)
Rooflights 0.9x	1	X	10.53	×	40.55	x	0.63	×	0.7	=	169.45	(82)
Rooflights 0.9x	1	X	10.53	×	74.78	x	0.63	X	0.7	=	312.52	(82)
Rooflights 0.9x	1	X	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	x	10.53	×	200.21	x	0.63	X	0.7	=	836.7	(82)



				r						_					_
Rooflights 0.9x 1	×	10.	53	×	18	35.57	x		0.63	×	0.7		=	775.55	(82)
Rooflights 0.9x 1	×	10.	53	x	14	42.19	x		0.63	x	0.7		=	594.24	(82)
Rooflights 0.9x 1	x	10.	53	x	9	3.09	x		0.63	x	0.7		=	389.03	(82)
Rooflights 0.9x 1	×	10.	53	× [4	9.71	x		0.63	x	0.7		=	207.75	(82)
Rooflights 0.9x 1	x	10.	53	x [2	5.27	x		0.63	x	0.7		=	105.6	(82)
Rooflights 0.9x 1	x	10.	53	x	1	6.69	x		0.63	x	0.7		=	69.77	(82)
				-											_
Solar gains in watts, c	alculated	l for eacl	n month				(83)n	n = Sı	um(74)m .	(82)m					
(83)m= 275.63 506.31	803.79	1203.68		16	36.71	1538.34	126	0.17	938.1	588.24	336.52	231	.92		(83)
Total gains – internal	and solar	(84)m =	- (73)m -	+ (8	33)m	, watts			Į		Į				
(84)m= 772.01 1000.43	1280.4	1651.65	1971.25	20	25.61	1909.22	163	8.34	1331.71	1010.7	1 792.2	713	.15		(84)
7. Mean internal tem	ooraturo	(hoating	60260n)								<u>!</u>			
					aroa f	rom Tok		Th	1 (%C)					04	(85)
Temperature during I	• •			-			ne a	, 111	I (C)					21	(65)
Utilisation factor for g	1			È		,	•		0	0.1					
Jan Feb	Mar	Apr	May		Jun	Jul		ug	Sep	Oct	Nov	<u> </u>	ec		(00)
(86)m= 1 0.99	0.98	0.89	0.69	0	.48	0.36	0.4	43	0.74	0.96	1	1			(86)
Mean internal tempe	rature in	living are	ea T1 (fo	ollo	w ste	ps 3 to 7	' in T	Fable	e 9c)						
(87)m= 19.72 19.94	20.29	20.71	20.93	2	0.99	21	2	1	20.93	20.55	20.05	19.	68		(87)
Temperature during I	neating p	eriods ir	rest of	dw	elling	from Ta	ble	9, Tł	n2 (°C)						
(88)m= 19.96 19.96	19.96	19.97	19.97	<u> </u>	9.98	19.98	19.		19.98	19.97	19.97	19.	97		(88)
Utilisation factor for g	i ins for i	rest of du	velling	h2	m (so		0-2)	I							
(89)m = 1 0.99	0.97	0.86	0.63	<u> </u>	.41	0.27	9 a) 0.3	34	0.65	0.95	0.99	1			(89)
											0.00				()
Mean internal tempe	1			<u> </u>	`		·		i	,	1			l	(0.0)
(90)m= 18.25 18.57	19.07	19.65	19.91	19	9.97	19.98	19.	.98	19.93	19.46	18.74	18.	19		(90)
									T	LA = LIV	ing area ÷ (4	4) =		0.47	(91)
Mean internal tempe	rature (fo	r the wh	ole dwel	lling	g) = fL	_A × T1	+ (1	– fL	A) × T2						
(92)m= 18.93 19.21	19.64	20.14	20.39	2	0.45	20.45	20.	.45	20.4	19.97	19.35	18.	89		(92)
Apply adjustment to t	he mean	internal	tempera	atu	re fro	m Table	4e,	whe	re appro	opriate		_			
(93)m= 18.93 19.21	19.64	20.14	20.39	20	0.45	20.45	20.	.45	20.4	19.97	19.35	18.	89		(93)
8. Space heating req	uirement														
Set Ti to the mean in				ed	at ste	ep 11 of	Tab	le 9b	o, so that	t Ti,m=	⊧(76)m an	d re-	cald	ulate	
the utilisation factor f	1	_		-							-			I	
Jan Feb	Mar	Apr	Мау		Jun	Jul	A	ug	Sep	Oct	Nov	D	ec		
Utilisation factor for g	· · ·		0.05			0.04				0.05					(0.4)
(94)m= 1 0.99	0.96	0.86	0.65	0	.44	0.31	0.3	38	0.69	0.95	0.99	1			(94)
Useful gains, hmGm	<u> </u>	<u> </u>	,		0.45	507.40	0.05	1	0.40.00	057.0				l	(05)
(95)m= 769.96 991.2		1421.98			9.45	597.16	625	5.37	916.32	957.67	786.95	711	.85		(95)
Monthly average exte	1			r	1	40.0	40			40.0	74			l	(06)
(96)m= 4.3 4.9	6.5	8.9	11.7		4.6	16.6	16		14.1	10.6	7.1	4.:	2		(96)
Heat loss rate for me	-	al tempe 1761.69		_		- ,		<u> </u>	<u> </u>	-	5 1000 0	0.044	0.00		(97)
(97)m= 2322.59 2266.67					7.82	598.25 b = 0.02	628		980.65	1466.2		2313	5.03		(37)
Space heating requir (98)m= 1155.16 857.12	ement fo 626.97	r eacn m 244.59	10ntn, к\ 53.2	/vn/	omont 0	n = 0.02		<u>(97)</u> 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0)mj x (378.39		1191	1.97		
(30)11= 1135.10 057.12	020.97	244.09	JJ.Z		0	0		,	U	510.38	, 017.01	119	1.07		



Total per year (kWh/year) = Sum(98) _{15,912} =											5325.1	(98)		
Space	e heatir	ng require	ement ir	n kWh/m²	/year								38.65	(99)
9a. En	ergy re	quiremer	nts – Ind	lividual h	eating s	ystems i	ncluding	micro-C	HP)					-
-	e heati	-			, .									1
				econdar		mentary			(22.1)				0	(201)
				nain syst	. ,			(202) = 1 -					1	(202)
			-	main sys				(204) = (20	02) × [1 –	(203)] =			1	(204)
	-	-		ting syste									93.4	(206)
Efficie	ency of	seconda	ry/suppl	ementar	y heatin	g system	ı, %						0	(208)
_	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	r
Space		<u>1 · · · · · · · · · · · · · · · · · · ·</u>	<u>```</u>					0	0	070.00	047.04	4404.07	I	
(= , ,)		857.12	626.97	244.59	53.2	0	0	0	0	378.39	817.81	1191.87		
(211)m	1 = {[(98 1236.78	i i	4)] } x ^ 671.28	100 ÷ (20 261.87)6) 56.96	0	0	0	0	405.13	875.6	1276.1	l	(211)
	1230.70	917.00	071.20	201.07	50.90	0	0	-	-	ar) = Sum(2)			5701.4	(211)
Snac	a heatir	na fuel (s	econdar	ry), kWh/	month						/15,1012	2	5701.4]()
•		01)] } x 1			monun									
(215)m=		0	0	0	0	0	0	0	0	0	0	0		
			-	-		-		Tota	l (kWh/yea	ar) =Sum(2	215) _{15,1012}	7	0	(215)
Water	heating	g												
Output	from w	I	ter (calc 203.15	ulated a	bove) 176.84	155.75	149.22	166.34	167.53	188.73	199.71	214.27	l	
Efficier		l 195.52		102	170.04	155.75	149.22	100.34	107.55	100.75	199.71	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	00.0	(217)
` ´		heating,		onth										
(219)m	n = (64)	<u>)m x 100</u>) ÷ (217)			1							1	
(219)m=	247.79	219.03	231.65	212.13	214.53	193.96	185.83	207.15	208.64	217.51	226.37	241.57		1
•								lota	I = Sum(2 ⁻		A/I. /	_	2606.15	(219)
	I totals		ed, main	system	1					K	Wh/year		kWh/year 5701.4	1
	-	fuel use		-,									2606.15	J
	•			a la atria	kaan ha								2000.13]
		•		electric	кеер-по	ſ							1	
centra	al heatir	ng pump	:									30		(230c)
boiler	with a	fan-assis	sted flue									45		(230e)
Total e	lectricit	y for the	above,	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
Electri	city for I	ighting											483.11	(232)
12a. (CO2 en	nissions ·	– Individ	lual heati	ing syste	ems inclu	uding mi	cro-CHP)					-
Energy Emission factor												Emissions		
							/h/year			kg CO			kg CO2/yea	r
Space	heating	g (main s	ystem 1)		(21	1) x			0.2	16	=	1231.5	(261)



Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	562.93	(264)
Space and water heating	(261) + (262) + (263) + (264) =			1794.43	(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	sun	n of (265)(271) =		2084.09	(272)

TER =

15.13 (273)