Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.33 *Printed on 10 March 2021 at 09:53:46*

Project Information:

Assessed By: Natalie King (STRO034719) Building Type: Mid-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 76m²

Site Reference: Lavant View - The Spires, Chichester Plot Reference: 113 Tavy [Mid] DCC4

Address: Tavy [Mid]

Client Details:

Name: Redrow Homes Southern Counties Limited

Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.54 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 16.04 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 44.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 36.6 kWh/m²

OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.28 (max. 0.30)	0.28 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	OK
Roof	0.12 (max. 0.20)	0.21 (max. 0.35)	OK
Openings	1.23 (max. 2.00)	1.50 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 5.01 (design value)

Maximum 10.0 OK

4 Heating efficiency

Main Heating system: Database: (rev 473, product index 017929):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Ideal Model: LOGIC COMBI Model qualifier: ESP1 35

(Combi)

Efficiency 89.6 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

Regulations Compliance Report

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Programmer, room ther	rmostat and TRVs	ок
Hot water controls:	No cylinder thermostat		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	th low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Not applicable			
9 Summertime temperature			
Overheating risk (South Eas	t England):	Not significant	ОК
Based on:	- '	-	
Overshading:		Average or unknown	
Windows facing: North East		3.55m²	
Windows facing: South West	t	3.12m ²	
Ventilation rate:		8.00	
Blinds/curtains:		None	

10 Key features

Thermal bridging 0.038 W/m²K
Doors U-value 1.1 W/m²K
Roofs U-value 0.11 W/m²K
Party Walls U-value 0 W/m²K

Code for Sustainable Homes Report

For use with Nov 2010 addendum 2014 England

Assessor and House Details

Assessor Name: Natalie King Assessor Number: STRO034719

Property Address: Tavy [Mid]

Building regulation assessment

 kg/m²/year

 TER
 17.54

 DER
 16.04

ENE 1 Assessment - Dwelling Emission Rate

Total Energy Type CO₂ Emissions for Codes Levels 1 - 5

	%	kg/m²/year	
DER from SAP 2012 DER Worksheet		16.04	(ZC1)
TER		17.54	
Residual CO2 emissions offset from biofuel CHP		0	(ZC5)
CO2 emissions offset from additional allowable electricty generation		0	(ZC7)
Total CO2 emissions offset from SAP Section 16 allowances		0	
DER accounting for SAP Section 16 allowances		16.04	
% improvement DER/TER	8.6		

Total Energy Type CO2 Emissions for Codes Levels 6

		kg/m²/year	
Ī	DER accounting for SAP Section 16 allowances	16.04	(ZC1)
	CO2 emissions from appliances, equation (L14)	16.38	(ZC2)
	CO2 emissions from cooking, equation (L16)	2.32	(ZC3)
Ī	Net CO2 emissions	36.8	(ZC8)

Result:

Credits awarded for ENE 1 = 1.4

Code Level = 3

ENE 2 - Fabric energy Efficiency

Fabric energy Efficiency: 36.61 Credits awarded for ENE 2 = 7.6

ENE 7 - Low or Zero Carbon (LZC) Technologies

Reduction in CO2 Emissions

	%	kg/m²/year	
Standard Case CO2 emissions		36.8	
Standard DER		18.1	
Actual Case CO2 emissions		36.8	
Actual DER		18.1	

Reduction in CO2 emissions

Credits awarded for ENE 7 = 0

Technologies eligible to contribute to achieving the requirements of this issue must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

The following requirements must also be met:

- · Where not provided by accredited external renewables there must be a direct supply of energy produced to the dwelling under assessment.
- Where covered by the Microgeneration Certification Scheme (MCS), technologies under 50kWe or 300kWth must be certified.
- Combined Heat and Power (CHP) schemes above 50kWe must be certified under the CHPQA standard.
- All technologies must be accounted for by SAP.

CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue. Where these schemes are above 50kWe they must be certified under the CHPQA.

It is the responsibly of the Accredited OCDEA and Code Assessor to ensure all technologies use in the calculation are appropriate before awarding credits.

Predicted Energy Assessment



Tavy [Mid]

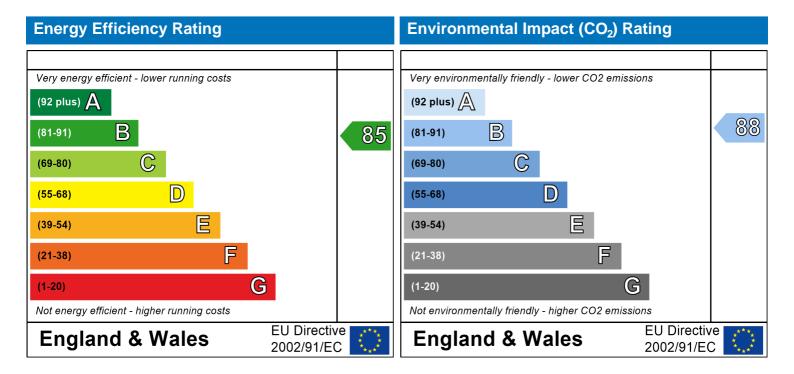
Dwelling type:
Date of assessment:
Produced by:

Mid-terrace House 08 November 2019 Natalie King

Total floor area: 76 m²

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

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



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

SAP Input

Property Details: 113 Tavy [Mid] DCC4

Address: Tavy [Mid] Located in: England

Region: South East England

UPRN:

Date of assessment: 08 November 2019
Date of certificate: 10 March 2021

Assessment type: New dwelling design stage

Transaction type: New dwelling Tenure type: Unknown

Related party disclosure: Employed by the professional dealing with the property transaction

Thermal Mass Parameter: Calculated 140.68 Water use <= 125 litres/person/day: True

PCDF Version: 473

Property description:

Dwelling type: House
Detachment: Mid-terrace
Year Completed: 2021

Floor Location: Floor area:

Floor 0 38 m^2 2.31 m Floor 1 38 m^2 2.61 m

Living area: 19.98 m² (fraction 0.263)

Front of dwelling faces: North East

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
Door	Manufacturer	Solid	low-E, $En = 0.2$, hard coat	Yes	PVC-U
Rear	Manufacturer	Half glazed	low-E, En = 0.2 , hard coat	Yes	PVC-U
Front	Manufacturer	Windows	low-E, En = 0.2 , hard coat	Yes	
Rear	Manufacturer	Windows	low-E, $En = 0.2$, hard coat	Yes	

Storey height:

Name:	Gap:	Frame Fa	actor: g-value:	U-value:	Area:	No. of Openings:
Door	16mm or more mm	0.7	0.72	1.1	2.06	1
Rear	16mm or more mm	0.7	0.72	1.5	1.91	1
Front	16mm or more	0.7	0.76	1.2	3.55	1
Rear	16mm or more	0.7	0.76	1.2	3.12	1

Name: Door	Type-Name:	Location: Walls	Orient: North East	Width: 0	Height: 0
Rear		Walls	South West	0	0
Front		Walls	North East	0	0
Rear		Walls	South West	0	0

Overshading: Average or unknown

Opaque Elements

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Карра:
External Elemen		opermige.	riot area.	o value.	rta varao.	odi tani wan.	парра.
Walls	41.39	10.64	30.75	0.28	0	False	48
Sloping	5.62	0	5.62	0.21	0		9
Plane ceiling	33.37	0	33.37	0.11	0		9
Floor	38			0.15			75
Internal Elemen	<u>ts</u>						
Stud	125.28						9

SAP Input

 Ceiling
 38
 9

 Floor
 38
 18

Party Elements

Party Wall 80.44 48

Ther	mal	hri	ida	129
11101	mai	DI.	uy	

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.0381

Length	Psi-value		
4.3	0.236	E1	Steel lintel with perforated steel base plate
6.79	0.01	E3	Sill
18.3	0.005	E4	Jamb
9.22	0.089	E5	Ground floor (normal)
9.22	-0.002	E6	Intermediate floor within a dwelling
17.95	0.041	E18	Party wall between dwellings
9.22	0.017	E11	Eaves (insulation at rafter level)
4.38	0.064	E2	Other lintels (including other steel lintels)
16.48	0.043	P1	Ground floor
14.48	0.035	P4	Roof (insulation at ceiling level)
2.44	0.058	P5	Roof (insulation at rafter level)

Ventilation:

Pressure test: Yes (As designed)

Ventilation: Natural ventilation (extract fans)

Number of chimneys: 0
Number of open flues: 0
Number of fans: 3
Number of passive stacks: 0
Number of sides sheltered: 2
Pressure test: 5.01

Main heating system:

Main heating system: Boiler systems with radiators or underfloor heating

Gas boilers and oil boilers

Fuel: mains gas

Info Source: Boiler Database

Database: (rev 473, product index 017929) Efficiency: Winter 87.3 % Summer: 90.5

Brand name: Ideal Model: LOGIC COMBI Model qualifier: ESP1 35 (Combi boiler)

Systems with radiators

Central heating pump: 2013 or later

Design flow temperature: Design flow temperature $>45\,^{\circ}\text{C}$

Boiler interlock: Yes Delayed start

Main heating Control:

Main heating Control: Programmer, room thermostat and TRVs

Control code: 2106

Secondary heating system:

Secondary heating system: None

Water heating:

Water heating: From main heating system

Water code: 901 Fuel :mains gas No hot water cylinder Solar panel: False

SAP Input

Others:

Electricity tariff: Standard Tariff
In Smoke Control Area: Unknown
Conservatory: No conservatory

Low energy lights: 100%

Terrain type: Low rise urban / suburban

EPC language: English Wind turbine: No Photovoltaics: None Assess Zero Carbon Home: No

		User Details:				
Assessor Name:	Natalie King	Stroma N	umber:	STRO	034719	
Software Name:	Stroma FSAP 2012	Software	Version:	Versio	n: 1.0.5.33	
		roperty Address: 113	Tavy [Mid] DCC	4		
Address :	Tavy [Mid]					
1. Overall dwelling dime	ensions:	Area(m²)	Av. Height(n	n)	Volume(m³)	
Ground floor		38 (1a)		(2a) =	87.78	(3a)
First floor		38 (1b)	x 2.61	(2b) =	99.18	」 (3b)
Total floor area TFA = (1)	a)+(1b)+(1c)+(1d)+(1e)+(1r	76 (4)				
Dwelling volume		```	+(3b)+(3c)+(3d)+(3e)+	+(3n) =	186.96	(5)
2. Ventilation rate:					100.00	
2. Ventuation rate.	main secondar heating heating	y other	total		m³ per houi	
Number of chimneys		+ 0	0	x 40 =	0	(6a)
Number of open flues	0 + 0	+ 0 :	0	x 20 =	0	(6b)
Number of intermittent fa	ns		3	x 10 =	30	(7a)
Number of passive vents			0	x 10 =	0	(7b)
Number of flueless gas fi	res		0	x 40 =	0	(7c)
				A in ala	angas nar ha	_
Infiltration due to altimose	the flues and force (60) (6b) (7	70) ((7b) ((70) —		,	anges per ho	_
•	ys, flues and fans = (6a)+(6b)+(7 neen carried out or is intended, procee		30 ue from (9) to (16)	÷ (5) =	0.16	(8)
Number of storeys in the		• /	, , , ,		0	(9)
Additional infiltration			I	(9)-1]x0.1 =	0	(10)
Structural infiltration: 0	.25 for steel or timber frame or	0.35 for masonry co	nstruction		0	(11)
if both types of wall are pa deducting areas of openia	resent, use the value corresponding to	the greater wall area (aft	er			_
	floor, enter 0.2 (unsealed) or 0.	.1 (sealed), else ente	r O		0	(12)
If no draught lobby, en	ter 0.05, else enter 0				0	(13)
Percentage of windows	s and doors draught stripped				0	(14)
Window infiltration		0.25 - [0.2 x (14	4) ÷ 100] =		0	(15)
Infiltration rate		(8) + (10) + (11)) + (12) + (13) + (15) =	•	0	(16)
Air permeability value,	q50, expressed in cubic metre	s per hour per squar	e metre of envelo	pe area	5.0100002288818	34 (17)
If based on air permeabil	ity value, then $(18) = [(17) \div 20] + (8)$	8), otherwise (18) = (16)			0.41	(18)
Air permeability value applie	es if a pressurisation test has been dor	ne or a degree air permeal	bility is being used	·		_
Number of sides sheltere	ed				2	(19)
Shelter factor		(20) = 1 - [0.075]	5 x (19)] =		0.85	(20)
Infiltration rate incorporat	ting shelter factor	$(21) = (18) \times (20)$	0) =		0.35	(21)
Infiltration rate modified f	or monthly wind speed				•	
Jan Feb	Mar Apr May Jun	Jul Aug S	ep Oct No	v Dec		
Monthly average wind sp	eed from Table 7					

4.3

3.8

3.8

3.7

4

4.3

4.5

4.7

Wind Factor (22a)m =	(22)m ÷	4										
(22a)m= 1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18]	
Adjusted infilt	ration rat	o (allowi	na for sk	ooltor an	d wind s	rnood) –	(21a) v	(22a)m	•	•		•	
0.45	0.44	0.43	0.38	0.38	0.33	0.33	0.32	0.35	0.38	0.39	0.41	1	
Calculate effe		-	rate for t	he appli	cable ca	ise]	_
If mechanic			l' N. (0		\ - (. (00)) (OO)			0	(23a)
If exhaust air h									o) = (23a)			0	(23b)
If balanced wit		•	•	ŭ		,		,	Ob) /	00h) [4 (00.0)	0	(23c)
a) If balance (24a)m= 0	ea mech	anicai ve	entilation 0	with he	at recov	ery (MV)	HR) (248	$\frac{1}{10} = \frac{2}{10}$	2b)m + (0	23b) × [1 – (23c)) ÷ 100]]	(24a)
b) If balance	<u> </u>		l		<u>l</u>	Į		Į	<u> </u>			J	(2 14)
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0	1	(24b)
c) If whole h		tract ver		or positiv		L ventilatio	<u> </u>	outside	<u> </u>	<u> </u>	ļ -	J	, ,
,	m < 0.5 ×			•	•				.5 × (23b	o)			
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24c)
d) If natural				•	•								
<u> </u>	m = 1, the	- ` 	<u> </u>	ŕ	`		- `		-	<u> </u>	T	1	(0.4.4)
(24d)m= 0.6	0.6	0.59	0.57	0.57	0.56	0.56	0.55	0.56	0.57	0.58	0.58		(24d)
Effective air	change 0.6	rate - er 0.59	nter (24a _{0.57}	or (24k) 0.57	o) or (24 0.56	c) or (24 0.56	d) in box	`	0.57	0.50	0.58	1	(25)
(25)m= 0.6	0.6	0.59	0.57	0.57	0.56	0.56	0.55	0.56	0.57	0.58	0.56		(23)
3. Heat losse	es and he	at loss r	aramat										
0. 1 loat 1000t	o ana m	out 1000 p	Jaramete	er:									
ELEMENT	Gros area	SS	Openin m	gs	Net Ar A ,r		U-val W/m2		A X U (W/		k-value kJ/m²-		X k I/K
	Gros	SS	Openin	gs		m²							
ELEMENT	Gros	SS	Openin	gs	A ,r	m ²	W/m2	2K	(W/				I/K
ELEMENT Doors Type 1	Gros area	SS	Openin	gs	A ,r	m² x	W/m2	2K = = =	(W/ 2.266				J/K (26)
ELEMENT Doors Type 1 Doors Type 2	Gros area	SS	Openin	gs	A ,r 2.06	m ² x x x x x1	W/m2 1.1 1.5	2K = = = • 0.04] =	2.266 2.865				(26) (26)
Doors Type 1 Doors Type 2 Windows Type	Gros area	SS	Openin	gs	A ,r 2.06 1.91 3.55	m ² x x x x x1	W/m ² 1.1 1.5 /[1/(1.2)+	2K = = = • 0.04] =	2.266 2.865 4.06				(26) (26) (27) (27)
Doors Type 1 Doors Type 2 Windows Type Windows Type	Gros area	ss (m²)	Openin	gs ¹²	A ,r 2.06 1.91 3.55 3.12	m ²	W/m2 1.1 1.5 /[1/(1.2)+	= = = 0.04] =	2.266 2.865 4.06 3.57		kJ/m²-	K k.	(26) (26) (27) (27) (28)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor	Gros area e 1 e 2	ss (m²)	Openin m	gs ¹²	A ,r 2.06 1.91 3.55 3.12	m ²	W/m2 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+	= 	(W// 2.266 2.865 4.06 3.57 5.7		kJ/m²-\	2850	(26) (26) (27) (27) (28) (29)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls	Gros area e 1 e 2	ss (m²)	Openin m	gs ¹²	A ,r 2.06 1.91 3.55 3.12 38 30.75	m ²	W/m ² 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28	eK = = = = = = =	(W// 2.266 2.865 4.06 3.57 5.7 8.61		75 48	2850 1476	(26) (26) (27) (27) (28) (29) (30)
Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1	Gros area e 1 e 2 41.3 5.6	ss (m²)	10.6- 0	gs ¹²	A ,r 2.06 1.91 3.55 3.12 38 30.75 5.62	m ²	W/m ² 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21	eK = = = = = = =	(W// 2.266 2.865 4.06 3.57 5.7 8.61 1.18		75 48 9	2850 1476 50.58	(26) (26) (27) (27) (28) (29) (30)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2	Gros area e 1 e 2 41.3 5.6	ss (m²)	10.6- 0	gs ¹²	A ,r 2.06 1.91 3.55 3.12 38 30.75 5.62 33.37	m ²	W/m ² 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21	eK = = = = = = =	(W// 2.266 2.865 4.06 3.57 5.7 8.61 1.18		75 48 9	2850 1476 50.58	(26) (26) (27) (27) (28) (29) (30) (31)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of 6	Gros area e 1 e 2 41.3 5.6 33.3 elements	ss (m²)	10.6- 0	gs ¹²	A ,r 2.06 1.91 3.55 3.12 38 30.75 5.62 33.37	m ²	W/m2 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	eK = = = = =	(W/l 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67		75 48 9	2850 1476 50.58	(26) (26) (27) (27) (28) (29) (30) (31) (31)
Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of 6 Party wall	Gros area e 1 e 2 41.3 5.6 33.3 elements	ss (m²)	10.6- 0	gs ¹²	A ,r 2.06 1.91 3.55 3.12 38 30.76 5.62 33.37 118.3	m ²	W/m2 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	eK = = = = =	(W/l 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67		75 48 9 9	2850 1476 50.58 300.3	(26) (26) (27) (27) (28) (29) (30) (31) (22) (32)
Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of 6 Party wall Internal wall **	Gros area e 1 e 2 41.3 5.6 33.3 elements	ss (m²)	10.6- 0	gs ¹²	A ,r 2.06 1.91 3.55 3.12 38 30.75 5.62 33.37 118.3 80.44	m ²	W/m2 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	eK = = = = =	(W/) 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67		75 48 9 9	2850 1476 50.58 300.3	(26) (26) (27) (27) (28) (29) (30) (31) (31) (22) (32) (32c)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of 6 Party wall Internal wall ** Internal floor	Gros area e 1 e 2 41.3 5.6 33.3 elements	39 2 37 5, m ²	Openin m 10.6- 0 0	indow U-va	A ,r 2.06 1.91 3.55 3.12 38 30.75 5.62 33.37 118.3 80.44 125.2 38 38 38	m ²	W/m2 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	eK = = = = = =	(W/) 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67	K)	75 48 9 9 48 9	2850 1476 50.58 300.3 3861. 1127.9 684	(26) (26) (27) (27) (28) (29) (30) (31) (2) (32) (32c) (32d)
Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of e Party wall Internal wall ** Internal floor Internal ceiling * for windows and	Gros area e 1 e 2 41.3 5.6 33.3 elements	ss (m²) 39 2 37 37 37 38 50 ws, use ear sides of in	Openin m 10.6- 0 0 offective with aternal wall	indow U-va	A ,r 2.06 1.91 3.55 3.12 38 30.76 5.62 33.37 118.3 80.44 125.2 38 38 38 alue calculus	m ²	W/m2 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	EK = = = = = = = =	(W/) 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67	K)	75 48 9 9 48 9	2850 1476 50.58 300.3 3861. 1127.9 684	(26) (26) (27) (27) (28) (29) (30) (31) (2) (32) (32d)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of e Party wall Internal wall ** Internal floor Internal ceiling * for windows and ** include the are	Gros area e 1 e 2 41.3 5.6 33.3 elements *	ss (m²) 39 2 37 5, m² cows, use el sides of ir = S (A x	Openin m 10.6- 0 0 offective with aternal wall	indow U-va	A ,r 2.06 1.91 3.55 3.12 38 30.76 5.62 33.37 118.3 80.44 125.2 38 38 38 alue calculus	m ²	W/m ² 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	2K =	(W/) 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67	K)	75 48 9 9 18 9	2850 1476 50.58 300.3 3861. 1127.9 684 342	(26) (26) (27) (27) (28) (29) (30) (31) (2) (32) (32c) (32d) (32e)
ELEMENT Doors Type 1 Doors Type 2 Windows Type Windows Type Floor Walls Roof Type1 Roof Type2 Total area of e Party wall Internal wall ** Internal floor Internal ceiling * for windows and ** include the are Fabric heat lo	Gros area e 1 e 2 41.3 5.6 33.3 elements * d roof winder as on both ss, W/K: Cm = S(ows, use es sides of in = S (A x k)	10.6- 10.6- 0 0 original walk	gs 1 ² 4 Indow U-vals and part	A ,r 2.06 1.91 3.55 3.12 38 30.75 5.62 33.37 118.3 80.44 125.2 38 38 alue calculatitions	x x x1 x1 x x x x x x x x x x x x x x x	W/m ² 1.1 1.5 /[1/(1.2)+ /[1/(1.2)+ 0.15 0.28 0.21 0.11	2K =	(W// 2.266 2.865 4.06 3.57 5.7 8.61 1.18 3.67	K)	75 48 9 9 18 9	2850 1476 50.58 300.3 3861. 1127.9 684 342	(26) (26) (27) (27) (28) (29) (30) (31) (2 (32) (32c) (32d) (33e)

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f

n be used inste													1/0/
nermal bridge					-	K						4.51	(36
details of therma otal fabric he	0 0	are not kn	own (36) =	= 0.05 x (3	1)			(33) ±	(36) =			00.44	
entilation hea		alculated	l monthly						$= 0.33 \times ($	25\m v (5)		36.44	(37
Jan	Feb	Mar		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
36.97	36.73	36.5	Apr 35.4	35.2	34.25	34.25	34.07	34.61	35.2	35.61	36.05		(3
eat transfer of									= (37) + (37)				•
9)m= 73.4	73.17	72.93	71.84	71.63	70.68	70.68	70.5	71.05	71.63	72.05	72.48		
70.1	70.11	72.00	7 1.0 1	7 1.00	70.00	1 7 0.00	7 0.0		Average =			71.84	(3
eat loss para	ameter (H	HLP), W/	m²K						= (39)m ÷				
0.97	0.96	0.96	0.95	0.94	0.93	0.93	0.93	0.93	0.94	0.95	0.95		_
umber of day	vs in mor	nth (Tabl	le 1a)					,	Average =	Sum(40) _{1.}	12 /12=	0.95	(4
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1)m= 31	28	31	30	31	30	31	31	30	31	30	31		(4
. Water hea	ting ener	gy requi	rement:								kWh/ye	ear:	
		N + 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.		38	l	`
if TFA > 13.9 if TFA £ 13.9 nnual average aduce the annual	9, N = 1 ge hot wa al average	+ 1.76 x ater usag hot water	ge in litre usage by	es per da 5% if the d	ay Vd,av Iwelling is	erage = designed	(25 x N)	+ 36		9)	0.79		·
if TFA £ 13.9 Innual averageduce the annual t more that 125	9, N = 1 ge hot wa al average blitres per p	+ 1.76 x ater usag hot water person per	ge in litre usage by a day (all w	es per da 5% if the d	ny Vd,av lwelling is not and co	erage = designed (ld)	(25 x N) to achieve	+ 36 a water us	se target o	9)).79		·
if TFA £ 13.9 Innual average duce the annual transfer that 125 Jan	9, N = 1 ge hot wa al average ilitres per p	+ 1.76 x ater usag hot water person per	ge in litre usage by day (all w Apr	es per da 5% if the d rater use, f May	ay Vd,av welling is not and co Jun	erage = designed i ld) Jul	(25 x N) to achieve	+ 36		9)			·
if TFA £ 13.5 nnual average duce the annual at more that 125 Jan ot water usage in	9, N = 1 ge hot wa al average is litres per p Feb in litres per	+ 1.76 x ater usag hot water person per Mar day for ea	ge in litre usage by day (all w Apr ach month	es per da 5% if the d rater use, f May Vd,m = fac	ay Vd,av lwelling is not and co Jun ctor from	erage = designed (d) Jul Table 1c x	(25 x N) to achieve Aug (43)	+ 36 a water us Sep	se target o	9) 90 Nov	.79 Dec		·
if TFA £ 13.9 Innual average duce the annual the more that 125 Jan It water usage in the thick the thic	9, N = 1 ge hot wa al average ilitres per p	+ 1.76 x ater usag hot water person per	ge in litre usage by day (all w Apr	es per da 5% if the d rater use, f May	ay Vd,av welling is not and co Jun	erage = designed i ld) Jul	(25 x N) to achieve	+ 36 a water us Sep	Oct 92.6	9) 90 Nov 96.23	Dec 99.87	1089.44	(4
if TFA £ 13.5 nnual average duce the annual at more that 125 Jan of water usage in	9, N = 1 ge hot wa al average i litres per p Feb in litres per 96.23	+ 1.76 x ater usag hot water person per Mar day for ea	ge in litre usage by day (all w Apr ach month 88.97	es per da 5% if the d rater use, I May Vd,m = fac 85.34	ay Vd,av lwelling is not and co Jun ctor from 1	erage = designed (d) Jul Table 1c x 81.71	(25 x N) to achieve Aug (43) 85.34	+ 36 a water us Sep	Oct 92.6 Total = Su	9) Nov 96.23 m(44) ₁₁₂ =	Dec 99.87	1089.44	(4
if TFA £ 13.9 Innual average duce the annual to more that 125 Jan Int water usage if the sergy content of the ser	9, N = 1 ge hot wa al average i litres per p Feb in litres per 96.23	+ 1.76 x ater usag hot water person per Mar day for ea	ge in litre usage by day (all w Apr ach month 88.97	es per da 5% if the d rater use, I May Vd,m = fac 85.34	ay Vd,av lwelling is not and co Jun ctor from 1	erage = designed (d) Jul Table 1c x 81.71	(25 x N) to achieve Aug (43) 85.34	+ 36 a water us Sep	Oct 92.6 Total = Su	9) Nov 96.23 m(44) ₁₁₂ =	Dec 99.87	1089.44	(4
if TFA £ 13.9 Innual average duce the annual to more that 125 Jan Int water usage if the sergy content of the ser	9, N = 1 ge hot wa al average i litres per p Feb in litres per 96.23	+ 1.76 x ater usag hot water person per Mar day for ea 92.6 used - cale	ge in litre usage by day (all w Apr ach month 88.97	es per da 5% if the d rater use, I May Vd,m = fac 85.34	ay Vd,av lwelling is not and co Jun ctor from 1 81.71	erage = designed and designed a	(25 x N) to achieve Aug (43) 85.34	+ 36 a water us Sep 88.97 0 kWh/mon 103.82	Oct 92.6 Fotal = Sunth (see Ta	9) Nov 96.23 m(44) ₁₁₂ = ables 1b, 1 132.07	Dec 99.87 c, 1d) 143.42	1089.44	(,
if TFA £ 13.5 Innual average aduce the annual at more that 125 Jan of water usage in 4)m= 99.87 pergy content of 5)m= 148.1	9, N = 1 ge hot wa al average is litres per p Feb in litres per 96.23 f hot water 129.53	+ 1.76 x ater usag hot water person per Mar day for ea 92.6 used - calc 133.66	ge in litre usage by day (all w Apr ach month 88.97 culated me	es per da 5% if the d rater use, h May Vd,m = fac 85.34 onthly = 4.	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48	erage = designed and ld) Jul Table 1c x 81.71 m x nm x E 89.41	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6	+ 36 a water us Sep 88.97 0 kWh/more 103.82	Oct 92.6 Total = Su 120.99	9) Nov 96.23 m(44) ₁₁₂ = ables 1b, 1 132.07	Dec 99.87 c, 1d) 143.42		(4
if TFA £ 13.5 nnual average duce the annual average in the annual average in the annual average in the average	9, N = 1 ge hot wa al average is litres per Feb in litres per 96.23 f hot water 129.53 vater heatin 19.43	+ 1.76 x ater usag hot water person per Mar day for ea 92.6 used - calc 133.66	ge in litre usage by day (all w Apr ach month 88.97 culated me	es per da 5% if the d rater use, h May Vd,m = fac 85.34 onthly = 4.	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48	erage = designed and ld) Jul Table 1c x 81.71 m x nm x E 89.41	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6	+ 36 a water us Sep 88.97 0 kWh/more 103.82	Oct 92.6 Total = Su 120.99	9) Nov 96.23 m(44) ₁₁₂ = ables 1b, 1 132.07	Dec 99.87 c, 1d) 143.42		(-
if TFA £ 13.9 nnual average aduce the annual at more that 125 Jan It water usage if the series of	9, N = 1 ge hot wa al average is litres per p 96.23 f hot water 129.53 vater heatin 19.43	+ 1.76 x ater usage hot water person per Mar day for ear 92.6 133.66 139.66	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no	es per da 5% if the da 5% if th	y Vd,av lwelling is not and co Jun ctor from 1 81.71 190 x Vd,r 96.48	erage = designed (d) Jul Table 1c x 81.71 m x nm x E 89.41 enter 0 in 13.41	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39	+ 36 a water us Sep 88.97 0 kWh/mor 103.82 0 to (61) 15.57	Oct 92.6 Total = Sunth (see Tail 120.99) Total = Sunth 18.15	9) Nov 96.23 m(44) 112 = ables 1b, 1 132.07 m(45) 112 =	99.87 = c, 1d) 143.42 =		(
if TFA £ 13.5 nnual average in the annual a	9, N = 1 ge hot wa al average is litres per p Feb in litres per 96.23 f hot water 129.53 vater heatin 19.43 loss: ne (litres)	+ 1.76 x ater usag hot water person per Mar day for ea 92.6 used - calc 133.66 ag at point 20.05	Apr Apr Ach month 88.97 culated mo 116.53 of use (no	es per da 5% if the d rater use, f May Vd,m = fac 85.34 onthly = 4. 111.81 o hot water 16.77 olar or W	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 storage), 14.47	erage = designed and ld) Jul Table 1c x 81.71 m x nm x E 89.41 enter 0 in 13.41 storage	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa	+ 36 a water us Sep 88.97 0 kWh/mor 103.82 0 to (61) 15.57	Oct 92.6 Total = Sunth (see Tail 120.99) Total = Sunth 18.15	9) Nov 96.23 m(44) 112 = ables 1b, 1 132.07 m(45) 112 =	99.87 = c, 1d) 143.42		
if TFA £ 13.9 Innual average duce the annual average duce the annual average in the state of the	9, N = 1 ge hot wa al average is litres per p 96.23 f hot water 129.53 vater heatin 19.43 loss: ne (litres)	+ 1.76 x ater usage hot water person per Mar day for early 133.66 133.66 and at point 20.05 including and no talk	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ng any so nk in dw	es per da 5% if the d rater use, t May Vd,m = fac 85.34 2011.81 20 hot water 16.77 Colar or W relling, e	y Vd,av welling is not and co Jun ctor from 1 81.71 190 x Vd,r 96.48 storage), 14.47	erage = designed (d) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage) litres in	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47)	+ 36 a water us Sep 88.97 0 kWh/mor 103.82 0 to (61) 15.57 ame vess	Oct 92.6 Total = Su 120.99 Total = Su 18.15 sel	9) Nov 96.23 m(44) ₁₁₂ = sbles 1b, 1 132.07 m(45) ₁₁₂ = 19.81	99.87 = c, 1d) 143.42 =		
if TFA £ 13.9 Innual average duce the annual average duce the annual average in the transport of the transpo	9, N = 1 ge hot wa al average is litres per p 96.23 Feb 129.53 Fhot water 129.53 vater heatin 19.43 loss: ne (litres) neating a p stored loss:	+ 1.76 x ater usage hot water person per Mar day for ear 92.6 used - calce 133.66 ag at point 20.05 including the modern of the water water series are series at the calce the modern of the calce the cal	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in	es per da 5% if the d fater use, f May Vd,m = fat 85.34 111.81 hot water 16.77 plar or W welling, e	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 r storage), 14.47 /WHRS nter 110	erage = designed (d) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous co	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47)	+ 36 a water us Sep 88.97 0 kWh/mor 103.82 0 to (61) 15.57 ame vess	Oct 92.6 Total = Su 120.99 Total = Su 18.15 sel	9) Nov 96.23 m(44) ₁₁₂ = sbles 1b, 1 132.07 m(45) ₁₁₂ = 19.81	99.87 = c, 1d) 143.42 =		
if TFA £ 13.5 nnual average annual average annual average annual average in the annual average in the average in the average average average average average volume community in the average	9, N = 1 ge hot wa gal average is litres per p 96.23 Feb 129.53 Fhot water 129.53 vater heatin 19.43 loss: ne (litres) neating a postored loss: turer's de	+ 1.76 x ater usage hot water person per Mar day for ear 92.6 used - calc 133.66 and at point 20.05 including and no talchot water eclared left.	Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in	es per da 5% if the d fater use, f May Vd,m = fat 85.34 111.81 hot water 16.77 plar or W welling, e	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 r storage), 14.47 /WHRS nter 110	erage = designed (d) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous co	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47)	+ 36 a water us Sep 88.97 0 kWh/mor 103.82 0 to (61) 15.57 ame vess	Oct 92.6 Total = Su 120.99 Total = Su 18.15 sel	9) Nov 96.23 m(44) ₁₁₂ = sbles 1b, 1 132.07 m(45) ₁₁₂ = 19.81	99.87 = c, 1d) 143.42 =		(
if TFA £ 13.9 Innual average aduce the annual average annual average in the annual average in the average in the average average volumes and average in the	9, N = 1 ge hot wa al average is litres per p 96.23 Feb 129.53 vater heatin 19.43 loss: ne (litres) neating a o stored loss: turer's defactor fro	+ 1.76 x ater usage hot water person per Mar 92.6 133.66 133.66 ag at point 20.05 including and no tale hot water eclared lem Table	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in oss facto 2b	es per da 5% if the d sater use, t May Vd,m = fac 85.34 111.81 hot water 16.77 colar or W relling, e acludes in or is known	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 r storage), 14.47 /WHRS nter 110	erage = designed (d) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous con/day):	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47) ombi boil	+ 36 a water us Sep 88.97 103.82 105.57 ame vess ers) ente	Oct 92.6 Total = Su 120.99 Total = Su 18.15 sel	9) Nov 96.23 m(44) ₁₁₂ = 19bles 1b, 1 132.07 m(45) ₁₁₂ = 19.81	Dec 99.87 c, 1d) 143.42 21.51		(. (. (.
if TFA £ 13.5 nnual average aduce the annual at more that 125 Jan of water usage if 4)m= 99.87 hergy content of 5)m= 148.1 instantaneous water storage corage volum community here atter storage (atter storage)	9, N = 1 ge hot was al average is litres per p 96.23 Feb 129.53 For water heatin 19.43 loss: he (litres) heating a stored loss: turer's defeator fro om water	+ 1.76 x ater usage hot water person per day for early sed - calculation and no tale hot water declared lem Table storage	Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in coss factor 2b , kWh/ye	es per da 5% if the d ater use, h May Vd,m = fac 85.34 onthly = 4. 111.81 o hot water 16.77 olar or W velling, e acludes in or is knowear	y Vd,av welling is not and co Jun ctor from 1 81.71 190 x Vd,r 96.48 r storage), 14.47 /WHRS nter 110 nstantar	erage = designed (d) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous con/day):	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47)	+ 36 a water us Sep 88.97 103.82 105.57 ame vess ers) ente	Oct 92.6 Total = Su 120.99 Total = Su 18.15	9) Nov 96.23 m(44) ₁₁₂ = ables 1b, 1 132.07 m(45) ₁₁₂ = 19.81	Dec 99.87 c, 1d) 143.42 21.51		((((
if TFA £ 13.5 nnual average educe the annual at more that 125 Jan of water usage if 4)m= 99.87 nergy content of 5)m= 148.1 instantaneous w 3)m= 22.21 dater storage corage volum community h therwise if no dater storage) If manufact emperature f	9, N = 1 ge hot wa al average is litres per p 96.23 Feb 129.53 vater heatin 19.43 loss: ne (litres) neating a o stored loss: turer's defactor fro om water turer's defactor fro om water	+ 1.76 x ater usage hot water person per Mar day for ear 92.6 used - calce 133.66 and at point 20.05 including and no talce hot water eclared leared leared storage eclared of	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in oss facto 2b , kWh/ye cylinder l	es per da 5% if the d fater use, f May Vd,m = fat 85.34 111.81 The hot water 16.77 Colar or W relling, e factudes in or is known ear oss factor oss factor	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 storage), 14.47 /WHRS nter 110 nstantar wn (kWh	erage = designed id) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous con/day): known:	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47) ombi boil	+ 36 a water us Sep 88.97 103.82 105.57 ame vess ers) ente	Oct 92.6 Total = Su 120.99 Total = Su 18.15	9) Nov 96.23 m(44) ₁₁₂ = 132.07 m(45) ₁₁₂ = 19.81	Dec 99.87 = c, 1d) 143.42 = 21.51		(44 (44 (44 (44 (45) (45)
if TFA £ 13.5 innual average duce the annual average duce the annual average in the transport of transport of the transport of the transport of transport of the transport of transport of the transport of t	9, N = 1 ge hot was all average is litres per	ter usage hot water person per Mar day for ear 92.6 133.66 133.66 130.05 including at point and no tale hot water eclared lear to storage eclared of factor free sections.	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in oss facto 2b , kWh/ye cylinder l om Tabl	es per da 5% if the d fater use, f May Vd,m = fat 85.34 111.81 The hot water 16.77 Colar or W relling, e factudes in or is known ear oss factor oss factor	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 storage), 14.47 /WHRS nter 110 nstantar wn (kWh	erage = designed id) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous con/day): known:	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47) ombi boil	+ 36 a water us Sep 88.97 103.82 105.57 ame vess ers) ente	Oct 92.6 Total = Su 120.99 Total = Su 18.15	9) Nov 96.23 m(44) ₁₁₂ = 132.07 m(45) ₁₁₂ = 19.81	Dec 99.87 = c, 1d) 143.42 = 21.51 0		(4 (4 (4 (4 (4 (4)
if TFA £ 13.5 nnual average educe the annual at more that 125 Jan of water usage if the pergy content of instantaneous w community if therwise if no dater storage of the pergy lost fro of water storage of the pergy lost fro of water storage of water storage of the pergy lost fro of water storage	9, N = 1 ge hot was all average is litres per p 96.23 Feb 129.53 Vater heatin 19.43 loss: ne (litres) neating a postored loss: turer's defactor fro turer's defage loss neating s from Tai	ter usage hot water person per Mar day for ear 92.6 used - calce 133.66 used - calce 120.05 including at point 20.05 including and no talce the teclared lear teclared lear teclared configured factor free sections be 2a	ge in litre usage by day (all w Apr ach month 88.97 culated mo 116.53 of use (no 17.48 ag any so nk in dw er (this in coss facto 2b , kWh/ye cylinder I com Tabl con 4.3	es per da 5% if the d fater use, f May Vd,m = fat 85.34 111.81 The hot water 16.77 Colar or W relling, e factudes in or is known ear oss factor oss factor	y Vd,av welling is not and co Jun ctor from 81.71 190 x Vd,r 96.48 storage), 14.47 /WHRS nter 110 nstantar wn (kWh	erage = designed id) Jul Table 1c x 81.71 89.41 enter 0 in 13.41 storage 0 litres in neous con/day): known:	(25 x N) to achieve Aug (43) 85.34 07m / 3600 102.6 boxes (46) 15.39 within sa (47) ombi boil	+ 36 a water us Sep 88.97 103.82 105.57 ame vess ers) ente	Oct 92.6 Total = Su 120.99 Total = Su 18.15	9) Nov 96.23 m(44) ₁₁₂ = 132.07 m(45) ₁₁₂ = 19.81	Dec 99.87 = c, 1d) 143.42 = 21.51 0		(4 (4 (4 (4 (4 (4)

Energy lost fro		•	, kWh/ye	ear			(47) x (51)) x (52) x (5	53) =		0		(54)
Enter (50) or (, ,	,					((50) ((44)			0		(55)
Water storage		culated f		month		i	((56)m = (55) × (41)r	n -	i	i	I	<i>4</i>
(56)m= 0	0	0	0	0 (56)m	0	0	0	7\m (56)	0	0	0	i 1	(56)
If cylinder contains								1			1	IX IT	
(57)m= 0	0	0	0	0	0	0	0	0	0	0	0		(57)
Primary circuit											0		(58)
Primary circuit				•	•	` '	, ,						
(modified by												ı	(50)
(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) ÷ 36	65 × (41))m						
(61)m= 14.11	12.72	14.05	13.56	13.99	13.5	13.93	13.97	13.53	14.03	13.62	14.1		(61)
Total heat requ	uired for	water he	eating ca	alculated	for eac	h month	(62)m =	0.85 × (45)m +	(46)m +	(57)m +	(59)m + (61)m	
(62)m= 162.21	142.25	147.71	130.09	125.8	109.99	103.34	116.56	117.36	135.02	145.69	157.52		(62)
Solar DHW input of	alculated	using App	endix G oı	Appendix	H (negati	ve quantity	v) (enter '0	' if no sola	r contribut	ion to wate	er heating)		
(add additional	lines if	FGHRS	and/or \	WWHRS	applies	, see Ap	pendix (3)					
(63)m= 0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output from wa	ater hea	ter											
(64)m= 162.21	142.25	147.71	130.09	125.8	109.99	103.34	116.56	117.36	135.02	145.69	157.52		_
							Outp	out from wa	ater heate	r (annual) ₁	12	1593.54	(64)
Heat gains fror	n water	heating	k\/\/h/m/	anth 0 2	5 ′ [0 85	v (45)m	. (61)~	1 . 0 0 .	. [/40\	. (E7)m	. (E0)m	1	
3		nouting,	KVVII/III	JIIIII 0.20	ა [0.00	× (43)111	+ (61)11	ıj + U.6 x	(46)m	+ (57)111	+ (59)111]	
(65)m= 52.77	46.25	47.96	42.14	40.67	35.46	33.21	37.6	37.9	43.74	+ (57)111 47.32	+ (59)III]	(65)
	46.25	47.96	42.14	40.67	35.46	33.21	37.6	37.9	43.74	47.32	51.21		(65)
(65)m= 52.77	46.25 n in calc	47.96 culation o	42.14 of (65)m	40.67 only if c	35.46	33.21	37.6	37.9	43.74	47.32	51.21		(65)
(65)m= 52.77 include (57)r 5. Internal ga	46.25 m in calc ins (see	47.96 culation of Table 5	42.14 of (65)m and 5a	40.67 only if c	35.46	33.21	37.6	37.9	43.74	47.32	51.21		(65)
(65)m= 52.77 include (57)r	46.25 m in calc ins (see	47.96 culation of Table 5	42.14 of (65)m and 5a	40.67 only if c	35.46	33.21	37.6	37.9	43.74	47.32	51.21		(65)
include (57)r 5. Internal ga Metabolic gain	46.25 m in calc ins (see s (Table	47.96 culation of Table 5	42.14 of (65)m and 5a	40.67 only if c	35.46 ylinder i	33.21 s in the c	37.6 dwelling	37.9 or hot w	43.74 ater is fr	47.32 om com	51.21 munity h		(65)
include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96	46.25 m in calcoins (see S (Table Feb 142.96	47.96 culation of Table 5 a 5), Wat Mar 142.96	42.14 of (65)m of and 5a ts Apr 142.96	40.67 only if c : May 142.96	35.46 ylinder is Jun 142.96	33.21 s in the c	37.6 dwelling Aug 142.96	37.9 or hot w Sep 142.96	43.74 ater is fr	47.32 om com	51.21 munity h		
include (57)r 5. Internal ga Metabolic gain Jan	46.25 m in calcoins (see S (Table Feb 142.96	47.96 culation of Table 5 a 5), Wat Mar 142.96	42.14 of (65)m of and 5a ts Apr 142.96	40.67 only if c : May 142.96	35.46 ylinder is Jun 142.96	33.21 s in the c	37.6 dwelling Aug 142.96	37.9 or hot w Sep 142.96	43.74 ater is fr	47.32 om com	51.21 munity h		
include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87	46.25 m in calculatins (see S (Table Feb 142.96) (calculate 46.96)	47.96 culation of Table 5 Mar 142.96 ted in Ap 38.19	42.14 of (65)m 6 and 5a ts Apr 142.96 oppendix 28.91	40.67 only if c : May 142.96 L, equati 21.61	35.46 ylinder is Jun 142.96 ion L9 of	33.21 s in the c Jul 142.96 r L9a), a 19.72	37.6 dwelling Aug 142.96 lso see 25.63	37.9 or hot w Sep 142.96 Table 5	43.74 ater is fr Oct 142.96	47.32 om com Nov 142.96	51.21 munity h		(66)
include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains	46.25 m in calculatins (see S (Table Feb 142.96) (calculate 46.96)	47.96 culation of Table 5 Mar 142.96 ted in Ap 38.19	42.14 of (65)m 6 and 5a ts Apr 142.96 oppendix 28.91	40.67 only if c : May 142.96 L, equati 21.61	35.46 ylinder is Jun 142.96 ion L9 of	33.21 s in the c Jul 142.96 r L9a), a 19.72	37.6 dwelling Aug 142.96 lso see 25.63	37.9 or hot w Sep 142.96 Table 5	43.74 ater is fr Oct 142.96	47.32 om com Nov 142.96	51.21 munity h		(66)
include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74	46.25 m in calcolors (see S (Table Feb 142.96) (calculat 46.96) ns (calculat 318.01)	47.96 culation of Table 5 Mar 142.96 ted in Ap 38.19 ulated in 309.78	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Appendix 292.26	40.67 only if c : May 142.96 L, equati 21.61 dix L, equali 270.14	Jun 142.96 ion L9 of 18.25 uation L	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43	43.74 ater is fr Oct 142.96 43.68 ble 5 257.95	47.32 om com Nov 142.96	51.21 munity h Dec 142.96		(66) (67)
include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai	46.25 m in calcolors (see S (Table Feb 142.96) (calculat 46.96) ns (calculat 318.01)	47.96 culation of Table 5 Mar 142.96 ted in Ap 38.19 ulated in 309.78	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Appendix 292.26	40.67 only if c : May 142.96 L, equati 21.61 dix L, equali 270.14	Jun 142.96 ion L9 of 18.25 uation L	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43	43.74 ater is fr Oct 142.96 43.68 ble 5 257.95	47.32 om com Nov 142.96	51.21 munity h Dec 142.96		(66) (67)
include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68	46.25 m in calculatins (see s (Table Feb 142.96) (calculatins (calcula	47.96 culation of Table 5 5), Wat Mar 142.96 ted in Ap 38.19 ulated in 309.78 ted in Ap 51.68	42.14 of (65)m 6 and 5a ts Apr 142.96 opendix 28.91 Append 292.26 opendix 51.68	40.67 only if c): May 142.96 L, equati 21.61 dix L, equati 270.14 L, equat	35.46 ylinder is Jun 142.96 ion L9 of 18.25 uation L 249.35 ion L15	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L12 235.47 or L15a)	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 , also se	37.9 or hot w Sep 142.96 Table 5 34.4 o see Table 240.43 ee Table	43.74 ater is fr Oct 142.96 43.68 ole 5 257.95 5	47.32 om com Nov 142.96 50.98	51.21 munity h Dec 142.96 54.34		(66) (67) (68)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far	46.25 m in calculatins (see s (Table Feb 142.96) (calculatins (calcula	47.96 culation of Table 5 5), Wat Mar 142.96 ted in Ap 38.19 ulated in 309.78 ted in Ap 51.68	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Append 292.26 opendix 51.68	40.67 only if c): May 142.96 L, equati 21.61 dix L, equ 270.14 L, equat 51.68	Jun 142.96 ion L9 of 18.25 uation L 249.35 ion L15 51.68	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L12 235.47 or L15a)	37.6 dwelling 142.96 lso see 25.63 3a), also 232.2 , also se 51.68	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43 ee Table 51.68	43.74 ater is fr Oct 142.96 43.68 ble 5 257.95 5 51.68	47.32 om com Nov 142.96 50.98 280.07	51.21 munity h Dec 142.96 54.34 300.86		(66) (67) (68)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3	46.25 m in calculatins (see S (Table Feb 142.96) (calculatins (calculatins) (calculati	47.96 culation of the Table 5	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Append 292.26 opendix 51.68 5a) 3	40.67 only if control only if	Jun 142.96 ion L9 o 18.25 uation L 249.35 ion L15 51.68	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47 or L15a) 51.68	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 , also se	37.9 or hot w Sep 142.96 Table 5 34.4 o see Table 240.43 ee Table	43.74 ater is fr Oct 142.96 43.68 ole 5 257.95 5	47.32 om com Nov 142.96 50.98	51.21 munity h Dec 142.96 54.34		(66) (67) (68) (69)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3 Losses e.g. ev	46.25 m in calcolors (see S (Table Feb 142.96) (calculat 46.96) ms (calculat 51.68) ms gains 3 aporatio	47.96 culation of Table 5 5), Wat Mar 142.96 ted in Ap 38.19 ulated in 309.78 ted in Ap 51.68 (Table 5	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Appendix 292.26 opendix 51.68 5a) 3 tive valu	40.67 only if c): May 142.96 L, equati 21.61 dix L, equ 270.14 L, equat 51.68 3 es) (Tab	35.46 ylinder is Jun 142.96 ion L9 of 18.25 uation L 249.35 ion L15 51.68 3 le 5)	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1. 235.47 or L15a) 51.68	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 , also se 51.68	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43 ee Table 51.68	43.74 ater is fr Oct 142.96 43.68 ole 5 257.95 5 51.68	47.32 om com Nov 142.96 50.98 280.07	51.21 munity h Dec 142.96 54.34 300.86		(66) (67) (68) (69) (70)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3 Losses e.g. ev (71)m= -95.3	46.25 m in calculatins (see s (Table Feb 142.96) (calculatins (calculatins (calculatins 18.01) (calculatins gains 3) aporatio -95.3	47.96 culation of the Table 5 culated in April 142.96 ted in April 142	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Append 292.26 opendix 51.68 5a) 3	40.67 only if control only if	Jun 142.96 ion L9 o 18.25 uation L 249.35 ion L15 51.68	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47 or L15a) 51.68	37.6 dwelling 142.96 lso see 25.63 3a), also 232.2 , also se 51.68	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43 ee Table 51.68	43.74 ater is fr Oct 142.96 43.68 ble 5 257.95 5 51.68	47.32 om com Nov 142.96 50.98 280.07	51.21 munity h Dec 142.96 54.34 300.86		(66) (67) (68) (69)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3 Losses e.g. ev (71)m= -95.3 Water heating	46.25 m in calculatins (see s (Table Feb 142.96) (calculatins (calculatins) (calculati	47.96 culation of the Table 5 culated in April 142.96 ted in April 142.96 culated in April 142.96 culated in April 142.96 culated in April 142.96 culated in April 142.96 culation of the Table 5 culation of the Tabl	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Append 292.26 opendix 51.68 5a) 3 tive valu -95.3	40.67 only if c): May 142.96 L, equati 21.61 dix L, equ 270.14 L, equat 51.68 3 es) (Tab	Jun 142.96 ion L9 of 18.25 uation L 249.35 ion L15 51.68 3 le 5) -95.3	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L12 235.47 or L15a) 51.68	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 , also se 51.68	37.9 or hot w Sep 142.96 Table 5 34.4 o see Table 240.43 ee Table 51.68 3 -95.3	43.74 ater is fr Oct 142.96 43.68 ole 5 257.95 5 51.68	47.32 om com Nov 142.96 50.98 280.07 51.68	51.21 munity h Dec 142.96 54.34 300.86 51.68		(66) (67) (68) (69) (70)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3 Losses e.g. ev (71)m= -95.3 Water heating (72)m= 70.93	46.25 m in calcolors (see S (Table Feb 142.96) (calculat 46.96) ns (calculat 51.68) ns gains 3 aporatio -95.3 gains (T 68.82	47.96 culation of the Table 5 5), Wat Mar 142.96 ted in Ap 38.19 ulated in 309.78 ted in Ap 51.68 (Table 5 3 an (negation -95.3) fable 5) 64.46	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Appendix 292.26 opendix 51.68 5a) 3 tive valu	40.67 only if c): May 142.96 L, equati 21.61 dix L, equ 270.14 L, equat 51.68 3 es) (Tab	35.46 ylinder is Jun 142.96 ion L9 of 18.25 uation L 249.35 ion L15 51.68 3 le 5) -95.3	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47 or L15a) 51.68 3 -95.3	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 , also se 51.68 3 -95.3	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43 ee Table 51.68 3 -95.3	43.74 ater is fr Oct 142.96 43.68 ble 5 257.95 51.68 3 -95.3	47.32 om com Nov 142.96 50.98 280.07 51.68 3	51.21 munity h Dec 142.96 54.34 300.86 51.68 3 -95.3		(66) (67) (68) (69) (70)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3 Losses e.g. ev (71)m= -95.3 Water heating (72)m= 70.93 Total internal	46.25 m in calc lins (see s (Table Feb 142.96 (calculat 46.96 ns (calc 318.01 (calculat 51.68 ns gains 3 aporatio -95.3 gains (T 68.82 gains =	47.96 culation of the Table 5	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Appendix 292.26 opendix 51.68 5a) 3 tive valu -95.3	40.67 only if c): May 142.96 L, equati 21.61 dix L, equ 270.14 L, equat 51.68 3 es) (Tab -95.3	35.46 ylinder is Jun 142.96 fon L9 of 18.25 uation L 249.35 fon L15 51.68 3 le 5) -95.3 49.25 (66)	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47 or L15a) 51.68 3 -95.3 44.64 m + (67)m	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 d, also se 51.68 3 -95.3	37.9 or hot w Sep 142.96 Table 5 34.4 o see Table 51.68 3 -95.3 52.64 + (69)m + (43.74 ater is fr Oct 142.96 43.68 ole 5 257.95 51.68 3 -95.3 58.79 70)m + (7	47.32 om com Nov 142.96 50.98 280.07 51.68 3 -95.3	51.21 munity h Dec 142.96 54.34 300.86 51.68 3 -95.3		(66) (67) (68) (69) (70) (71)
include (57)r include (57)r 5. Internal ga Metabolic gain Jan (66)m= 142.96 Lighting gains (67)m= 52.87 Appliances gai (68)m= 314.74 Cooking gains (69)m= 51.68 Pumps and far (70)m= 3 Losses e.g. ev (71)m= -95.3 Water heating (72)m= 70.93	46.25 m in calconins (see s (Table Feb 142.96) (calculat 46.96) ns (calculat 51.68) ns gains 3 aporatio -95.3 gains (T 68.82) gains = 536.12	47.96 culation of the Table 5 5), Wat Mar 142.96 ted in Ap 38.19 ulated in 309.78 ted in Ap 51.68 (Table 5 3 an (negation -95.3) fable 5) 64.46	42.14 of (65)m and 5a ts Apr 142.96 opendix 28.91 Append 292.26 opendix 51.68 5a) 3 tive valu -95.3	40.67 only if c): May 142.96 L, equati 21.61 dix L, equ 270.14 L, equat 51.68 3 es) (Tab	35.46 ylinder is Jun 142.96 ion L9 of 18.25 uation L 249.35 ion L15 51.68 3 le 5) -95.3	33.21 s in the of Jul 142.96 r L9a), a 19.72 13 or L1: 235.47 or L15a) 51.68 3 -95.3	37.6 dwelling Aug 142.96 lso see 25.63 3a), also 232.2 , also se 51.68 3 -95.3	37.9 or hot w Sep 142.96 Table 5 34.4 o see Tal 240.43 ee Table 51.68 3 -95.3	43.74 ater is fr Oct 142.96 43.68 ble 5 257.95 51.68 3 -95.3	47.32 om com Nov 142.96 50.98 280.07 51.68 3	51.21 munity h Dec 142.96 54.34 300.86 51.68 3 -95.3		(66) (67) (68) (69) (70)

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

Orientation: Access F Table 6d		Area m²			Flux Fable 6a		g_ Table (6b	Т	FF able 6c		Gains (W)	
Northeast 0.9x 0.77	x	3.5	55	x	11.28	X	0.76		х	0.7	=	14.77	(75)
Northeast 0.9x 0.77	х	3.5	55	x	22.97	j×	0.76		х	0.7	=	30.06	(75)
Northeast 0.9x 0.77	x	3.5	55	x	41.38	Īx	0.76		x	0.7	=	54.16	(75)
Northeast _{0.9x} 0.77	х	3.5	55	x	67.96	Īx	0.76		x	0.7	=	88.94	(75)
Northeast 0.9x 0.77	х	3.5	55	x	91.35	T x	0.76		x	0.7	=	119.55	(75)
Northeast 0.9x 0.77	X	3.5	55	x	97.38	x	0.76		x [0.7	=	127.46	(75)
Northeast 0.9x 0.77	X	3.5	55	x	91.1	Īx	0.76		x T	0.7	=	119.23	(75)
Northeast 0.9x 0.77	x	3.5	55	x	72.63	X	0.76		×	0.7		95.05	(75)
Northeast 0.9x 0.77	X	3.5	55	x	50.42	x	0.76		x [0.7	=	65.99	(75)
Northeast 0.9x 0.77	x	3.5	55	x	28.07	T x	0.76		x [0.7	=	36.73	(75)
Northeast 0.9x 0.77	x	3.5	55	x	14.2	X	0.76		x	0.7	=	18.58	(75)
Northeast _{0.9x} 0.77	x	3.5	55	x	9.21	X	0.76		x	0.7	=	12.06	(75)
Southwest _{0.9x} 0.77	x	3.1	2	x	36.79	Ī	0.76		x [0.7	=	42.32	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	62.67	Ī	0.76		x [0.7	=	72.09	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	85.75	Ī	0.76		× F	0.7	=	98.64	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	106.25	Ī	0.76		× [0.7	=	122.22	(79)
Southwest _{0.9x} 0.77	х	3.1	2	x	119.01	Ī	0.76		x [0.7	=	136.89	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	118.15	Ī	0.76		× F	0.7	=	135.9	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	113.91	Ī	0.76		x [0.7		131.03	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	104.39	ĺ	0.76		x [0.7		120.08	(79)
Southwest _{0.9x} 0.77	X	3.1	2	x	92.85	ĺ	0.76		x [0.7		106.8	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	69.27	Ī	0.76		x [0.7		79.68	(79)
Southwest _{0.9x} 0.77	x	3.1	2	x	44.07	ĺ	0.76		x [0.7		50.69	(79)
Southwest _{0.9x} 0.77	х	3.1	2	x	31.49	Ī	0.76		хГ	0.7		36.22	(79)
0.1		.	(1)			-	0 (74)	(0.0					
Solar gains in watts, ca (83)m= 57.09 102.15	alculated 152.8	211.16	256.45	263.3	6 250.26	(83)n 215	n = Sum(74) 5.13 172.		2)m 6.41	69.27	48.28	1	(83)
Total gains – internal a				<u> </u>		1 2 10				00.27	10.20	J	()
(84)m= 597.97 638.27	667.55	693.18	705.2	682.5	<u> </u>	625	5.83 602.	.6 579	9.15	568.37	574.64	1	(84)
7. Mean internal temp	ocraturo	(heating	easear)									
Temperature during h					a from Ta	hle 9	Th1 (°C)				21	(85)
Utilisation factor for g	٠.			•		DIC J	, 1111 (0	,				21	
Jan Feb	Mar	Apr	May	Jui		ΤΔ	ug Se	n C	Oct	Nov	Dec]	
(86)m= 0.96 0.95	0.92	0.87	0.77	0.61		0.			.88	0.94	0.97		(86)
Mean internal temper				<u> </u>			!					J	
(87)m= 19.71 19.86	20.12	20.47	20.75	20.9	i i	20.		7 20).52	20.07	19.68]	(87)
` '				<u> </u>			!					J	
Temperature during h (88)m= 20.11 20.11	20.12	20.13	20.13	20.1	-	20.).13	20.13	20.12	1	(88)
` '				<u> </u>			20.1	. 20				J	()
Utilisation factor for g	0.91	est of d	welling, 0.73	h2,m 0.54	`	9a) 0.4	41 0.64	1 1 0	.85	0.93	0.96	1	(89)
(09)111= 0.90 0.94	0.81	0.00	0.73	0.54	0.36	1 0.4	1 0.04	- 0.	.00	0.93	0.90	J	(03)

(90)m= 18.94	ıaı temper	ature in	the rest	of dwelli	ng T2 (f	ollow ste	ps 3 to	7 in Tabl	e 9c)				
(50)111= 10.94	19.09	19.35	19.69	19.95	20.1	20.13	20.13	20.05	19.75	19.31	18.92		(90)
	Į.							f	LA = Livin	g area ÷ (4	4) =	0.26	(91)
Mean intern	al temper	atura (fo	r the wh	مام طسما	lling) – f	ΙΔ ν Τ1	⊥ (1 _ fl	Δ) ~ T2					_
(92)m= 19.14		19.55	19.89	20.16	20.32	20.36	20.35	20.27	19.95	19.51	19.12		(92)
Apply adjus										10.01			(- /
(93)m= 18.99	1	19.4	19.74	20.01	20.17	20.21	20.2	20.12	19.8	19.36	18.97		(93)
8. Space he	eating regu	uirement											
Set Ti to the	mean int	ernal ter	nperatui		ed at st	ep 11 of	Table 9l	o, so tha	t Ti,m=(76)m an	d re-calc	culate	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation fa	actor for g	ains, hm	:	-				-				l	
(94)m= 0.95	0.93	0.9	0.83	0.72	0.54	0.38	0.42	0.64	0.84	0.92	0.95		(94)
Useful gains	s, hmGm	, W = (94	1)m x (84	4)m							•	l	
(95)m= 565.85	5 593.65	599.98	577.5	506.64	371.31	250.48	261.97	385.5	485.31	524.1	547.07		(95)
Monthly ave	erage exte	rnal tem	perature	from Ta	able 8						•		
(96)m= 4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat loss ra	ite for mea	an intern	al tempe	erature,	Lm , W =	=[(39)m :	x [(93)m	– (96)m]	•	•	l	
(97)m= 1078.3	8 1042.28	941.04	778.83	595.05	393.4	254.89	268.16	427.46	659.25	883.33	1070.49		(97)
Space heati	ing require	ement fo	r each n	nonth, k\	/Vh/mon	th = 0.02	4 x [(97)m – (95)m] x (4	1)m		l	
(98)m= 381.32	2 301.48	253.75	144.96	65.78	0	0	0	0	129.41	258.65	389.42		
					•		Tota	l per year	(kWh/year	r) = Sum(9	8)15,912 =	1924.78	(98)
Space heati	ina reauire	ement in	kWh/m²	?/vear								25.33	(99)
·				,,								20.00	(/
9a. Energy re	eauremer		طاميناها		intoine i	م مرزام درام م	unai awa C	YLID)					
Space boot		its – mai	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space heat Fraction of s	ing:					J	micro-C	CHP)				0	
Fraction of	i ng: space hea	at from se	econdar	y/supple		system		, , , , , , , , , , , , , , , , , , ,				0	╡`
Fraction of s	ing: space hea space hea	at from se at from m	econdar ain syst	y/supple em(s)		system	(202) = 1 ·	- (201) =	(202)] _			1	(202
Fraction of s Fraction of s	ing: space hea space hea total heati	at from se at from m ng from i	econdar ain syst main sys	y/supple em(s) stem 1		system	(202) = 1 ·	, , , , , , , , , , , , , , , , , , ,	(203)] =			1	(202
Fraction of s	ing: space hea space hea total heati	at from se at from m ng from i	econdar ain syst main sys	y/supple em(s) stem 1		system	(202) = 1 ·	- (201) =	(203)] =			1	(202
Fraction of s Fraction of s	ting: space hea space hea total heatil f main spa	at from se at from m ng from i ace heati	econdar ain syst main sys ing syste	y/supple em(s) stem 1 em 1	mentary	system	(202) = 1 ·	- (201) =	(203)] =			1	(202
Fraction of s Fraction of s Fraction of t Efficiency of	space hea space hea sotal heating f main spa f seconda	at from se at from m ng from i ace heati	econdar ain syst main sys ing syste	y/supple em(s) stem 1 em 1	mentary	system	(202) = 1 ·	- (201) =	(203)] =	Nov	Dec	1 1 90.5	(202 (204 (206 (208
Fraction of s Fraction of s Fraction of t Efficiency of	space heaspace heaspace heastotal heating from main spans freeconda	at from se at from m ng from i ace heati ry/supple Mar	econdary nain syst main sys ng syste ementar Apr	y/supple em(s) stem 1 em 1 y heating	mentary g systen Jun	system	(202) = 1 · (204) = (2	- (201) = 02) × [1 -		Nov	Dec	1 1 90.5	(202 (204 (206 (208
Fraction of s Fraction of s Fraction of s Fraction of s Efficiency of Efficiency of Jan	space heating: space heating total heating f main space f seconda Feb ing require	at from se at from m ng from i ace heati ry/supple Mar	econdary nain syst main sys ng syste ementar Apr	y/supple em(s) stem 1 em 1 y heating	mentary g systen Jun	system	(202) = 1 · (204) = (2	- (201) = 02) × [1 -		Nov 258.65	Dec 389.42	1 1 90.5	(202 (204 (206 (208
Fraction of s Fraction of s Fraction of s Fraction of s Efficiency of Efficiency of Jan Space heati 381.32	space head space head sotal heating from main space from secondary from Febring requires 2 301.48	at from set from ming from the ace heating ry/supplement (content of the ace ace ace ace ace ace ace ace ace ac	econdary nain systemain system ang systementar Apr alculated	y/supple em(s) stem 1 em 1 y heating May d above) 65.78	mentary g system Jun	system 1, % Jul	(202) = 1 · (204) = (2	- (201) = 02) × [1 - 1	Oct	· · · · · · · · · · · · · · · · · · ·		1 1 90.5	(202 (204 (206 (208 ear
Fraction of s Fraction of s Fraction of s Fraction of t Efficiency of Efficiency of Jan Space heati 381.32 (211)m = {[(9	space hear space hear sotal heating frequire seconda Febring requires 301.48	at from set from ming from the ace heating ry/supplement (compared 253.75	econdary nain systemain system ang systementar Apr alculater 144.96 00 ÷ (20	y/supple em(s) stem 1 em 1 y heating May d above) 65.78	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug	- (201) = 02) × [1 - (Oct 129.41	258.65	389.42	1 1 90.5	(202 (204 (206 (208 ear
Fraction of s Fraction of s Fraction of s Fraction of s Efficiency of Efficiency of Jan Space heati 381.32	space heating for main spatial for seconda Febring required 301.48 18) m x (20	at from set from ming from the ace heating ry/supplement (content of the ace ace ace ace ace ace ace ace ace ac	econdary nain systemain system ang systementar Apr alculated	y/supple em(s) stem 1 em 1 y heating May d above) 65.78	mentary g system Jun	system 1, % Jul	(202) = 1 · (204) = (2 Aug 0	- (201) = 02) × [1 - (Oct 129.41 142.99	258.65	389.42 430.3	1 1 90.5 0 kWh/ye	(202 (204 (206 (208 ear
Fraction of s Fr	space hear space hear sotal heating from the secondar February (2) 301.48 (2) 333.13	at from set from many from the set of the se	econdary nain systemain systemain systementar Apralculated 144.96 00 ÷ (20 160.18	y/supple em(s) stem 1 em 1 y heating May d above) 65.78 06) 72.69	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0	- (201) = 02) × [1 - (Oct 129.41 142.99	258.65	389.42 430.3	1 1 90.5	(202 (204 (206 (208 ear
Fraction of s Fr	space head space head sotal heating from the space head sotal heating from the space head space head sotal heating from the space head space he	at from set from ming from the ace heating ry/supplement (compared to 253.75 at a 280.38 at a 190.38 a	econdary nain systemain systematar Apr alculated 144.96 00 ÷ (20 160.18	y/supple em(s) stem 1 em 1 y heating May d above) 65.78 06) 72.69	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0	- (201) = 02) × [1 - (Oct 129.41 142.99	258.65	389.42 430.3	1 1 90.5 0 kWh/ye	(202 (204 (206 (208 ear
Fraction of s Fr	space hear space hear sotal heating from the secondar Feb secondar	at from set from ming from in ace heating mar lement (continue 253.75 lement) x 1 280.38 econdary 00 ÷ (20	econdary main systemain systematar Apralculated 144.96 00 ÷ (20 160.18	y/supple em(s) stem 1 em 1 y heating May d above) 65.78 06) 72.69 month	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0	- (201) = 02) × [1 - 0] Sep 0 0 I (kWh/yea	Oct 129.41 142.99 ar) =Sum(2	258.65 285.8 211) _{15,1012}	389.42 430.3	1 1 90.5 0 kWh/ye	(202 (204 (206 (208 ear
Fraction of s Fr	space head space head sotal heating from the space head sotal heating from the space head space head sotal heating from the space head space he	at from set from ming from the ace heating ry/supplement (compared to 253.75 at a 280.38 at a 190.38 a	econdary nain systemain systematar Apr alculated 144.96 00 ÷ (20 160.18	y/supple em(s) stem 1 em 1 y heating May d above) 65.78 06) 72.69	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0 Tota	- (201) = 02) × [1 - 1	Oct 129.41 142.99 ar) =Sum(2)	258.65 285.8 211) _{15,1012}	389.42 430.3	1 90.5 0 kWh/ye	(202 (204 (206 (208 ear (211
Fraction of s Fr	space hear space hear space hear sotal heating f main space f seconda Februing require 2 301.48 8)m x (20 333.13 ing fuel (second) 3 x 1 0	at from set from ming from in ace heating mar lement (continue 253.75 lement) x 1 280.38 econdary 00 ÷ (20	econdary main systemain systematar Apralculated 144.96 00 ÷ (20 160.18	y/supple em(s) stem 1 em 1 y heating May d above) 65.78 06) 72.69 month	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0 Tota	- (201) = 02) × [1 - 0] Sep 0 0 I (kWh/yea	Oct 129.41 142.99 ar) =Sum(2)	258.65 285.8 211) _{15,1012}	389.42 430.3	1 1 90.5 0 kWh/ye	(202 (204 (206 (208 ear (211
Fraction of s Fr	space hear space hear space hear sotal heating f main space f secondar Feb ing required 2 301.48 (8)m x (20 5 333.13 (1)	at from set from ming from ing from ing from ing from ing from ing from ing from the	econdary nain systemain systemain systemater Apr alculater 144.96 00 ÷ (20 160.18 y), kWh/8) 0	y/supple em(s) stem 1 em 1 y heating May d above 65.78 06) 72.69 month	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0 Tota	- (201) = 02) × [1 - 1	Oct 129.41 142.99 ar) =Sum(2)	258.65 285.8 211) _{15,1012}	389.42 430.3	1 90.5 0 kWh/ye	(201) (202) (204) (206) (208) ear (211) (211)
Fraction of s Fr	space hear space hear space hear space hear sotal heating f main space f seconda Feb sing required and space in the space hear space hear space hear space in the space in th	at from set from ming from ing from ing from ing from ing from ing from ing from the	econdary nain systemain systemain systemater Apr alculater 144.96 00 ÷ (20 160.18 y), kWh/8) 0	y/supple em(s) stem 1 em 1 y heating May d above 65.78 06) 72.69 month	g system Jun 0	system n, % Jul 0	(202) = 1 · (204) = (2 Aug 0 Tota	- (201) = 02) × [1 - 1	Oct 129.41 142.99 ar) =Sum(2)	258.65 285.8 211) _{15,1012}	389.42	1 90.5 0 kWh/ye	(202) (204) (206) (208) ear (211)

(217)m= 89.52 89.45 89.3	88.96 88.37	87.3	87.3	87.3	87.3	88.84	89.32	89.55]	(217)
Fuel for water heating, kWh/mc										
$ (219)m = (64)m \times 100 \div (217) $ $ (219)m = 181.2 159.03 165.42 $	m 146.24 142.35	125.99	118.37	133.52	134.43	151.98	163.11	175.9	1	
`	ļ	<u> </u>		Tota	I = Sum(2	19a) ₁₁₂ =	<u> </u>	<u> </u>	1797.53	(219)
Annual totals						k\	Wh/yea	r	kWh/year	⊿ -
Space heating fuel used, main	system 1								2126.82	
Water heating fuel used									1797.53	
Electricity for pumps, fans and	electric keep-hot	t								
central heating pump:								30]	(230c)
boiler with a fan-assisted flue								45]	(230e)
Total electricity for the above, k	:Wh/year			sum	of (230a)	(230g) =			75	(231)
Electricity for lighting									373.51	(232)
Total delivered energy for all us	ses (211)(221)	+ (231)	+ (232).	(237b)	=				4460.17	(338)
10a. Fuel costs - individual he	ating systems:									
		Fue	al l			Fuel P	rice		Fuel Cost	
			h/year			(Table			£/year	
Space heating - main system 1		(211) x			3.4	.8	x 0.01 =	74.01	(240)
Space heating - main system 2		(213)) x			0		x 0.01 =	0	(241)
Space heating - secondary		(215)) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fuel)		(219))			3.4	.8	x 0.01 =	62.55	(247)
Pumps, fans and electric keep-	hot	(231))			13.	19	x 0.01 =	9.89	(249)
(if off-peak tariff, list each of (23	30a) to (230g) se			icable a	nd apply	fuel pri	ce acco	rding to	Table 12a	_
Energy for lighting		(232))			13.	19	x 0.01 =	49.27	(250)
Additional standing charges (Ta	able 12)								120	(251)
Appendix Q items: repeat lines	(253) and (254)	as need	ed							
Total energy cost	(245)(247) + (250	0)(254)	=					315.73	(255)
11a. SAP rating - individual he	eating systems									
Energy cost deflator (Table 12)									0.42	(256)
Energy cost factor (ECF)	[(255) x	(256)] ÷ [(4	1) + 45.0]	=					1.1	(257)
SAP rating (Section 12)									84.71	(258)
12a. CO2 emissions – Individu	ual heating syste	ms inclu	ding mi	cro-CHP)					
		Ene	ergy			Emiss	ion fac	tor	Emissions	
			h/year			kg CO	2/kWh		kg CO2/yea	ar
Space heating (main system 1)		(211)) x			0.2	16	=	459.39	(261)
Space heating (secondary)		(215)) x			0.5	19	=	0	(263)
Water heating		(219)) x			0.2	16	=	388.27	(264)
							_ _			

Space and water heating	(261) + (262) + (263) + (264) =		847.66 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	193.85 (268)
Total CO2, kg/year	sum	m of (265)(271) =	1080.44 (272)
CO2 emissions per m ²	(272	(2) ÷ (4) =	14.22 (273)
El rating (section 14)			88 (274)

13a. Primary Energy

	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22 =	2594.73 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22	2192.99 (264)
Space and water heating	(261) + (262) + (263) + (264) =		4787.72 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	230.25 (267)
Electricity for lighting	(232) x	0 =	1146.68 (268)
'Total Primary Energy	sum	of (265)(271) =	6164.65 (272)
Primary energy kWh/m²/year	(272	2) ÷ (4) =	81.11 (273)

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 10 March 2021

Property Details: 113 Tavy [Mid] DCC4

Dwelling type:Mid-terrace House

Located in: England

Region: South East England

Cross ventilation possible: Yes Number of storeys: 2

Front of dwelling faces: North East

Overshading: Average or unknown

Overhangs: None

Thermal mass parameter: Calculated 140.68

Night ventilation: False Blinds, curtains, shutters: None

Ventilation rate during hot weather (ach): 8 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient: 493.57 (P1)

Transmission heat loss coefficient: 36.4

Summer heat loss coefficient: 530.01 (P2)

Overhangs:

Orientation:	Ratio:	Z_overhangs:
--------------	--------	--------------

North East (Front) 0 1 South West (Rear) 0 1

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
North East (Front)	1	0.9	1	0.9	(P8)
South West (Rear)	1	0.9	1	0.9	(P8)

Solar gains:

Orientation		Area	Flux	\mathbf{g}_{-}	FF	Shading	Gains
North East (Front)	0.9 x	3.55	105.45	0.76	0.7	0.9	161.32
South West (Rear)	0.9 x	3.12	126.97	0.76	0.7	0.9	170.71
						Total	332.03 (P3/P4)

Internal gains.

	June	July	August
Internal gains	416.18	399.15	407.7
Total summer gains	769.76	731.18	695.34 (P5)
Summer gain/loss ratio	1.45	1.38	1.31 (P6)
Mean summer external temperature (South East England)	15.4	17.4	17.5
Thermal mass temperature increment	1.02	1.02	1.02
Threshold temperature	17.87	19.79	19.83 (P7)
Likelihood of high internal temperature	Not significant	Not significant	Not significant

Assessment of likelihood of high internal temperature: Not significant