Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.17 Printed on 16 June 2023 at 14:56:07

Project Information:

Assessed By: Ben Talbutt (STRO036639) **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 82.7m² Site Reference: Fosters Estate Block D Plot Reference: D1-01

Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity (c)

Fuel factor: 1.55 (electricity (c))

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

Dwelling Carbon Dioxide Emission Rate (DER) 11.71 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 57.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 50.6 kWh/m²

OK 2 Fabric U-values

Element Average Highest

External wall 0.15 (max. 0.30) 0.20 (max. 0.70) OK Party wall 0.00 (max. 0.20) OK OK

Floor 0.10 (max. 0.25) 0.10 (max. 0.70)

Roof (no roof) Openings 1.41 (max. 2.00) 1.48 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

Maximum **OK** 10.0

4 Heating efficiency

Main Heating system: Community heating schemes - Heat pump

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Charging system linked to use of community heating,

programmer and at least two room thermostats

Hot water controls: No cylinder thermostat

No cylinder

OK

OK

Regulations Compliance Report

| 7 Low energy lights | | |
|---|--------------|----|
| Percentage of fixed lights with low-energy fittings | 100.0% | |
| Minimum | 75.0% | OK |
| 8 Mechanical ventilation | | |
| Continuous supply and extract system | | |
| Specific fan power: | 0.61 | |
| Maximum | 1.5 | OK |
| MVHR efficiency: | 88% | |
| Minimum | 70% | OK |
| 9 Summertime temperature | | |
| Overheating risk (Thames valley): | Not assessed | ? |
| 10 Key features | | |
| Air permeablility | 3.0 m³/m²h | |
| Party Walls U-value | 0 W/m²K | |
| Floors U-value | 0.1 W/m²K | |
| Community heating, heat from electric heat pump | | |

Predicted Energy Assessment

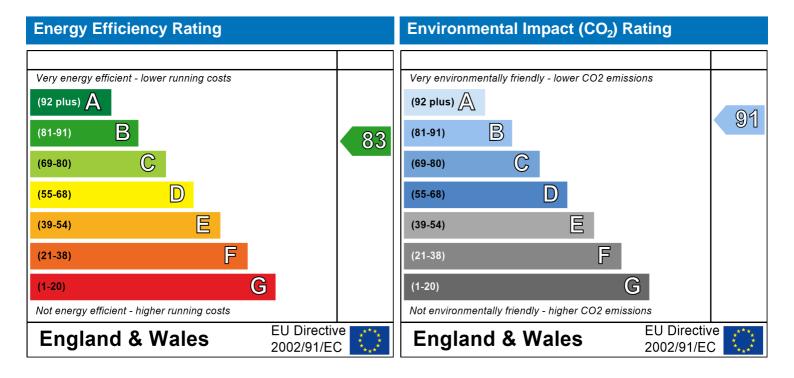


Dwelling type:
Date of assessment:
Produced by:
Total floor area:

Ground floor Flat
13 October 2022
Ben Talbutt
82.7 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: D1-01

Address:

Located in: England Region: Thames valley

UPRN:

Date of assessment: 13 October 2022 Date of certificate: 16 June 2023

Assessment type: New dwelling design stage

Transaction type:

Tenure type:

Related party disclosure:

Thermal Mass Parameter:

New dwelling

Unknown

No related party

Indicative Value Medium

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

PCDF Version: 505

Property description:

Dwelling type: Flat

Detachment:

Year Completed: 2022

Floor Location: Floor area:

Floor 0 42.39 m² Storey height: 2.82 m

40.31 m²

Living area: 32.22 m² (fraction 0.39)

Front of dwelling faces: Unspecified

Opening types:

Floor 1

| Name: Front Door | Source: Manufacturer | Type: Solid | Glazing: | Argon: | Frame: Wood |
|---------------------|-------------------------|----------------|--------------------------------|--------|---|
| Win 1 | Manufacturer | Windows | low-E, En = 0.05, soft coat | No | *************************************** |
| Win 2 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |
| Win 3 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |
| Win 4 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |
| Win 5 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |
| Win 6 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |
| Win 7 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |
| Win 8 | Manufacturer | Windows | low-E, $En = 0.05$, soft coat | No | |

3.15 m

| Name: | Gap: | Frame Factor | : g-value: | U-value: | Area: | No. of Openings: |
|------------|--------------|--------------|------------|----------|-------|------------------|
| Front Door | mm | 1 | 0 | 1.48 | 2.52 | 1 |
| Win 1 | 16mm or more | 0.8 | 0.4 | 1.4 | 0.72 | 1 |
| Win 2 | 16mm or more | 0.8 | 0.4 | 1.4 | 1.61 | 1 |
| Win 3 | 16mm or more | 0.8 | 0.4 | 1.4 | 2.01 | 1 |
| Win 4 | 16mm or more | 0.8 | 0.4 | 1.4 | 0.91 | 1 |
| Win 5 | 16mm or more | 0.8 | 0.4 | 1.4 | 5.95 | 1 |
| Win 6 | 16mm or more | 0.8 | 0.4 | 1.4 | 1.99 | 1 |
| Win 7 | 16mm or more | 0.8 | 0.4 | 1.4 | 0.9 | 1 |
| Win 8 | 16mm or more | 0.8 | 0.4 | 1.4 | 0.9 | 1 |

| Name: | Type-Name: | Location: | Orient: | Width: | Height: |
|------------|------------|-----------|------------|--------|---------|
| Front Door | | Ext Wall | South East | 1.05 | 2.4 |
| Win 1 | | Ext Wall | South East | 0.3 | 2.4 |
| Win 2 | | Ext Wall | South East | 1.21 | 1.33 |
| Win 3 | | Ext Wall | South East | 1.02 | 1.97 |
| Win 4 | | Ext Wall | South East | 0.46 | 1.97 |
| Win 5 | | Ext Wall | North West | 2.48 | 2.4 |
| Win 6 | | Ext Wall | North West | 1.02 | 1.95 |

SAP Input

 Win 7
 Ext Wall
 North West
 0.46
 1.95

 Win 8
 Ext Wall
 South West
 0.46
 1.95

Overshading: Average or unknown

| Type: | Gross area: | Openings: | Net area: | U-value: | Ru value: | Curtain wall: | Карра: |
|------------------|-------------|-----------|-----------|----------|-----------|---------------|--------|
| External Element | <u>ts</u> | | | | | | |
| Ext Wall | 95.6 | 17.51 | 78.09 | 0.14 | 0 | False | N/A |
| Concrete Column | 12.99 | 0 | 12.99 | 0.2 | 0 | False | N/A |
| Ground Floor | 42.39 | | | 0.1 | | | N/A |
| Internal Element | <u>S</u> | | | | | | |
| Party Elements | | | | | | | |
| Party Wall | 56.48 | | | | | | N/A |

Thermal bridges:

| Thermal bridges: | | User-defined | d (individual PSI | -values) | Y-Value = 0.0813 |
|------------------|------------|--------------|-------------------|----------|--|
| Ü | | Length | Psi-value | | |
| | [Approved] | 4.73 | 0.3 | E2 | Other lintels (including other steel lintels) |
| | [Approved] | 4.49 | 0.04 | E3 | Sill |
| | [Approved] | 36.64 | 0.05 | E4 | Jamb |
| | [Approved] | 18.43 | 0.16 | E5 | Ground floor (normal) |
| | [Approved] | 18.43 | 0.07 | E7 | Party floor between dwellings (in blocks of flats) |
| | [Approved] | 18.43 | 0.07 | E6 | Intermediate floor within a dwelling |
| | [Approved] | 11.94 | 0.09 | E16 | Corner (normal) |
| | [Approved] | 11.94 | 0.06 | E18 | Party wall between dwellings |
| | | 0 | 0.08 | E14 | Flat roof |
| | | 0 | 0.32 | E20 | Exposed floor (normal) |
| | [Approved] | 0 | -0.09 | E17 | Corner (inverted – internal area greater than external area) |
| | | 9.55 | 0.16 | P1 | Ground floor |
| | | 9.55 | 0 | P2 | Intermediate floor within a dwelling |
| | | 9.55 | 0 | P3 | Intermediate floor between dwellings (in blocks of flats) |
| | | 0 | 0.24 | P8 | Exposed floor (inverted) |

Ventilation:

Pressure test: Yes (As designed)

Ventilation: Balanced with heat recovery

0

Number of wet rooms: Kitchen + 1

0.24

Ductwork: Insulation, Rigid

Approved Installation Scheme: True

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

Main heating system

Main heating system: Community heating schemes

Heat source: Community heat pump

heat from electric heat pump, heat fraction 1, efficiency 383

P4

Roof (insulation at ceiling level)

Piping>=1991, pre-insulated, low temp, variable flow

Main heating Control.

Main heating Control: Charging system linked to use of community heating, programmer and at least two room

thermostats

SAP Input

Control code: 2312

Secondary heating system:

Secondary heating system: None

Water heating:

Water heating: From main heating system

Water code: 901

Fuel :heat from boilers - mains gas

No hot water cylinder Solar panel: False

Others

Electricity tariff: 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 D | etails: | | | | | | |
|--|----------------------------|---|-----------------|-------------|--------------|--|---------|-----------|--------------|------|
| Assessor Name: | Ben Talbutt | | | Strom | | | | | 036639 | |
| Software Name: | Stroma FSAP 20 | | | Softwa | | rsion: | | Versio | n: 1.0.5.17 | |
| Address . | | Pro | operty <i>i</i> | Address | : D1-01 | | | | | |
| Address: 1. Overall dwelling dimen | sions: | | | | | | | | | |
| 1. Overall awelling aimen | 310113. | | Area | a(m²) | | Av. Hei | aht(m) | | Volume(m³ |) |
| Ground floor | | | | • • | (1a) x | 2.8 | _ ` ' | (2a) = | 119.54 | (3a) |
| First floor | | | 4 | 0.31 | (1b) x | 3. | 15 | (2b) = | 126.98 | (3b) |
| Total floor area TFA = (1a) | +(1b)+(1c)+(1d)+(1 | e)+(1n) | | 32.7 | (4) | | | J | | |
| Dwelling volume | | | | | |)+(3c)+(3d) | +(3e)+ | .(3n) = | 246.52 | (5) |
| 2. Ventilation rate: | | | | | | | | | | ` ′ |
| Z. Verillialion fale. | | secondary | • | other | | total | | | m³ per hou | r |
| Number of chimneys | heating + [| heating 0 | 1 + [| 0 | 7 = [| 0 | X 4 | 40 = | 0 | (6a) |
| Number of open flues | 0 + | 0 | 」 | 0 | 」 | 0 | x2 | 20 = | 0 | (6b) |
| Number of intermittent fan: | | 0 | J L | | J | 0 | x | 10 = | 0 | (7a) |
| Number of passive vents | | | | | L | 0 | x | 10 = | 0 | (7b) |
| Number of flueless gas fire | ne | | | | L | 0 | x | 40 = | 0 | (7c) |
| Number of fluciess gas fire | | | | | L | 0 | | | U | (70) |
| | | | | | | | | Air ch | anges per ho | ur |
| Infiltration due to chimneys | s, flues and fans = | (6a)+(6b)+(7a |)+(7b)+(| 7c) = | Γ | 0 | | ÷ (5) = | 0 | (8) |
| If a pressurisation test has bee | en carried out or is inten | ded, proceed | to (17), d | otherwise o | continue fr | rom (9) to (1 | 16) | | | |
| Number of storeys in the | dwelling (ns) | | | | | | | | 0 | (9) |
| Additional infiltration | | | | | | | [(9) | -1]x0.1 = | 0 | (10) |
| Structural infiltration: 0.2 | | | | | • | ruction | | | 0 | (11) |
| if both types of wall are pre- deducting areas of opening | | esponding to t | he great | er wall are | a (after | | | | | |
| If suspended wooden flo | or, enter 0.2 (unse | aled) or 0.1 | (seale | ed), else | enter 0 | | | | 0 | (12) |
| If no draught lobby, ente | r 0.05, else enter 0 | | | | | | | | 0 | (13) |
| Percentage of windows | and doors draught | stripped | | | | | | | 0 | (14) |
| Window infiltration | | | | 0.25 - [0.2 | ! x (14) ÷ 1 | 100] = | | | 0 | (15) |
| Infiltration rate | | | | (8) + (10) | + (11) + (1 | 12) + (13) + | (15) = | | 0 | (16) |
| Air permeability value, q | 50, expressed in cu | ıbic metres | per ho | our per s | quare m | etre of er | rvelope | area | 3 | (17) |
| If based on air permeability | | | | | | | | | 0.15 | (18) |
| Air permeability value applies | if a pressurisation test h | as been done | or a deg | gree air pe | rmeability | is being us | ed | ı | | _ |
| Number of sides sheltered | | | | (20) = 1 - | [0 075 v (* | 10\1 - | | | 2 | (19) |
| Shelter factor | | | | | ` | 19)] = | | | 0.85 | (20) |
| Infiltration rate incorporation | | | | (21) = (18 |) x (20) = | | | | 0.13 | (21) |
| Infiltration rate modified for | | | | Ι, | | | | | 1 | |
| L | Mar Apr May | / Jun | Jul | Aug | Sep | Oct | Nov | Dec | | |
| Monthly average wind spe | ed from Table 7 | , , , , , , , , , , , , , , , , , , , | | ı | | | | | 1 | |

4.9

4.4

4.3

3.8

3.8

3.7

4.3

4.5

4.7

5

(22)m=

| Wind Factor (2 | 22a\m - | (22)m ÷ | Л | | | | | | | | | | |
|---|--|--|-------------------|-------------------|--|--|---|---|--|-------------|--------------------|--------|---|
| (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 | | |
| Λ -li tl i - filtu | | . /-!!: | | | ما دینانہ ما م | | (04 -) | (00-) | | | | l | |
| Adjusted infiltr | 0.16 | e (allowi _{0.16} | ng for sr 0.14 | 0.14 | 0.12 | 0.12 epeed) = | 0.12 | (22a)m 0.13 | 0.14 | 0.14 | 0.15 | | |
| Calculate effec | | | - | | 1 | | 1 0.12 | 1 0.10 | 0.14 | 0.14 | 0.10 | | |
| If mechanica | al ventila | tion: | | | | | | | | | | 0.5 | (23a) |
| If exhaust air h | | | | | | | | |) = (23a) | | | 0.5 | (23b) |
| If balanced with | | • | • | _ | | , | | • | | | | 74.8 | (23c) |
| a) If balance | | | | | | - ` ` | - ^ ` ` | í ` | r ´ ` | | <u> </u> | ÷ 100] | (0.4.) |
| (24a)m= 0.29 | 0.29 | 0.28 | 0.27 | 0.26 | 0.25 | 0.25 | 0.24 | 0.25 | 0.26 | 0.27 | 0.28 | | (24a) |
| b) If balance | | | | | | | - ^ ` ` | í ` | r Ó - Ò | | | | (O.4F.) |
| (24b)m= 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | (24b) |
| c) If whole h | iouse ext n < 0.5 × | | | • | • | | | | E v (22h | ,) | | | |
| (24c)m = 0 | 0.5 x | (23b), t | nen (240 | $\frac{(230)}{0}$ | | wise (24 | $\frac{C}{C} = (22)$ | 0) III + 0. | .5 × (23L | 0 | 0 | | (24c) |
| d) If natural | | · | · | | | | | | | | 0 | | (210) |
| | n = 1, the | | | | | | | | 0.5] | | | | |
| (24d)m= 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (24d) |
| Effective air | change | rate - er | iter (24a |) or (24k | o) or (24 | c) or (24 | d) in bo | x (25) | ! | ! | | ı | |
| (25)m= 0.29 | 0.29 | 0.28 | 0.27 | 0.26 | 0.25 | 0.25 | 0.24 | 0.25 | 0.26 | 0.27 | 0.28 | | (25) |
| 3. Heat losse | s and he | eat loss r | paramete | ër. | | | | | | | | | |
| ELEMENT | Gros | • | | | N | | | | | | | | |
| | area | _ | Openin m | - | Net Ar A ,r | | U-val W/m2 | | A X U (W/I | | k-value kJ/m²-l | | AXk J/K |
| Doors | area | _ | • | - | | m² | | | | K) | | | |
| Doors Windows Type | | _ | • | - | A ,r | m² x | W/m2 | 2K = [| (W/I | K) | | | d/K |
| | e 1 | _ | • | - | A ,r | m² x x1 | W/m2 1.48 | 2K = [- 0.04] = [| (W/l | K) | | | (J/K (26) |
| Windows Type | e 1 e 2 | _ | • | - | A ,r 2.52 | m² x x1 x1 | W/m2 1.48 /[1/(1.4)+ | | 3.7296 0.95 | K) | | | (26) (27) |
| Windows Type | e 1 e 2 e 3 | _ | • | - | A ,r 2.52 0.72 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{ccc} 2K \\ & = [\\ & 0.04] = [\\ & 0.04] = [\\ & 0.04] = [\\ \end{array} $ | 0.95 2.13 | K) | | | (26) (27) (27) |
| Windows Type Windows Type Windows Type | e 1 e 2 e 3 | _ | • | - | A ,r 2.52 0.72 1.61 2.01 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{c} 2K \\ \hline \\ -0.04] = \begin{bmatrix} \\ -0.04] = \\ \end{bmatrix} $ $ \begin{array}{c} -0.04] = \begin{bmatrix} \\ -0.04] = \\ \end{bmatrix} $ | (W/l 3.7296 0.95 2.13 2.66 | K) | | | (26) (27) (27) (27) |
| Windows Type Windows Type Windows Type | e 1 e 2 e 3 e 4 | _ | • | - | A ,r 2.52 0.72 1.61 2.01 0.91 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{ccc} 2K \\ \hline & 0.04 \\ & 0.$ | (W/l 3.7296 0.95 2.13 2.66 1.21 | K) | | | (26) (27) (27) (27) (27) |
| Windows Type Windows Type Windows Type Windows Type | e 1 e 2 e 3 e 4 e 5 e 6 | _ | • | - | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{ccc} 2K & = & \\ -0.04] & = & \\ -0.04] & = & \\ -0.04] & = & \\ -0.04] & = & \\ -0.04] & = & \\ -0.04] & = & \\ -0.04] & = & \\ \end{array} $ | (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 | K) | | | (26) (27) (27) (27) (27) (27) |
| Windows Type Windows Type Windows Type Windows Type Windows Type | e 1 e 2 e 3 e 4 e 5 e 6 e 7 | _ | • | - | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{ccc} 2K \\ & = [\\ & 0.04] = [\\ & 0.04$ | (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 | K) | | | (26) (27) (27) (27) (27) (27) (27) (27) |
| Windows Type | e 1 e 2 e 3 e 4 e 5 e 6 e 7 | _ | • | - | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{ccc} 2K \\ & = [\\ & 0.04] = [\\ & 0.04$ | (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 | K) | | | (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type Floor | e 1 e 2 e 3 e 4 e 5 e 6 e 7 e 8 | (m²) | m | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | EK = [- 0.04] = [| (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 | K) | | | (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type | e 1 e 2 e 3 e 4 e 5 e 6 e 7 e 8 | (m²) | 17.5 | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 0.9 42.39 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | EK = [- 0.04] = [| (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 | K) | | | (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type | e 1 e 2 e 3 e 4 e 5 e 6 e 7 e 8 | (m²) | m | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | EK = [- 0.04] = [| (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 | K) | | | (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type Floor Walls Type1 Walls Type2 Total area of e | e 1 e 2 e 3 e 4 e 5 e 6 e 7 e 8 | (m²) | 17.5 | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.36 78.09 150.9 | m ² | W/m² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.1 0.14 | EK = [- 0.04] = [| (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 4.239 10.93 2.6 | K) | | | (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type | 95.6 95.6 12.9 | (m²) 6 9 , m² | 17.5 | 1 ndow U-ve | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 150.9 56.48 alue calcul | m ² | W/m² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.1 0.14 0.2 | EK = [- 0.04] = | (W/l 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 2.6 | k) | kJ/m²-ŀ | | (26) (27) (27) (27) (27) (27) (27) (27) (27 |
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| if TF if TF if TF nnua educe t more t wate t more t | A > 13.9 A £ 13.9 I average the annual enthal 125 Jan 103.25 content of 153.11 taneous w 22.97 storage e volume munity he wise if no storage nanufaction anufaction anufactio | Po, N = 1 Po, N | ter usage hot water person per day for early 138.19 138.19 138.19 100.73 110.10din nd no tale hot water hot water declared less storage eclared of factor free sections. | ge in litre usage by day (all w Apr ach month 91.99 culated mo 120.48 of use (no 18.07 ag any so ank in dw er (this in oss facto 2b , kWh/ye cylinder l com Tabl | es per da 5% if the of water use, I May Vd,m = fa 88.23 onthly = 4. 115.6 o hot water 17.34 olar or W welling, e ncludes i or is kno | ay Vd,av liwelling is that and color from 5 84.48 190 x Vd,r 99.75 14.96 /WHRS enter 110 nstantar wn (kWh | erage = designed old) Jul Table 1c x 84.48 m x nm x L 92.44 enter 0 in 13.87 storage 0 litres in neous con/day): known: | (25 x N) to achieve Aug (43) 88.23 07m / 3600 106.07 boxes (46) 15.91 within sa (47) ombi boil | + 36 a water us Sep 91.99 107.34 107.34 16.1 ame vess ers) ente | Oct 95.74 Fotal = Sunth (see Tail 125.09) Fotal = Sunth 18.76 | 9) 93 Nov 99.49 m(44) ₁₁₂ = ables 1b, 1 136.55 m(45) ₁₁₂ = 20.48 47) | Dec 103.25 = c, 1d) 148.28 = 22.24 0 0 0 10 | | |

| Energy lost from water | · otorogo | Is\A/b/se | or | | | (47) v (E1) | \ v (E2) v (I | = 2) _ | | | 1 | (E 4) |
|---|--|--|---|--|--|---|--|--|---|--|---------------|--|
| Energy lost from water Enter (50) or (54) in (5 | _ | Kvvii/ye | al | | | (47) X (31) |) x (52) x (|)3) = | - | .03 | | (54) (55) |
| Water storage loss cal | , | or each | month | | | ((56)m = (| 55) × (41)r | m | | .03 | | (55) |
| (56)m= 32.01 28.92 | 32.01 | 30.98 | 32.01 | 30.98 | 32.01 | 32.01 | 30.98 | 32.01 | 30.98 | 32.01 | | (56) |
| If cylinder contains dedicate | | | | | | | | | | | ix H | () |
| (57)m= 32.01 28.92 | 32.01 | 30.98 | 32.01 | 30.98 | 32.01 | 32.01 | 30.98 | 32.01 | 30.98 | 32.01 | | (57) |
| Primary circuit loss (ar | hual) fran | m Toblo | . 2 | | <u> </u> | | <u> </u> | | ! | 0 | | (58) |
| Primary circuit loss (all | , | | | 59)m = (| (58) ÷ 36 | 65 × (41) | m | | | 0 | | (00) |
| (modified by factor fi | | | , | , | ` ' | ` ' | | r thermo | stat) | | | |
| (59)m= 23.26 21.01 | 23.26 | 22.51 | 23.26 | 22.51 | 23.26 | 23.26 | 22.51 | 23.26 | 22.51 | 23.26 | | (59) |
| Combi loss calculated | for each r | month (| 61)m = | (60) ÷ 36 | 65 × (41) |)m | | | | | • | |
| (61)m= 0 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (61) |
| Total heat required for | water hea | ating ca | alculated | for eac | h month | (62)m = | 0.85 × (| 45)m + | (46)m + | (57)m + | (59)m + (61)m | |
| (62)m= 208.39 183.84 | 193.47 | 173.97 | 170.88 | 153.25 | 147.71 | 161.35 | 160.83 | 180.37 | 190.04 | 203.56 | | (62) |
| Solar DHW input calculated | using Appe | ndix G or | Appendix | H (negati | ve quantity | /) (enter '0 | ' if no sola | r contribut | ion to wate | er heating) | l | |
| (add additional lines if | FGHRS a | and/or V | VWHRS | applies | , see Ap | pendix (| 3) | | | | | |
| (63)m= 0 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (63) |
| Output from water hea | ter | | | | | | • | | | | • | |
| (64)m= 208.39 183.84 | 193.47 | 173.97 | 170.88 | 153.25 | 147.71 | 161.35 | 160.83 | 180.37 | 190.04 | 203.56 | | |
| | • | | | | | Outp | out from wa | ater heate | r (annual)₁ | 12 | 2127.66 | (64) |
| Heat gains from water | heating, I | kWh/mo | onth 0.2 | 5 ′ [0.85 | × (45)m | + (61)m | n1 + 0 8 x | (/46)m | + (57)m | + (59)m | 1 | |
| | | | | | (, | . (0://: | 1] 1 0.0 / | (TO) | · (01) | 1 (00)111 |] | |
| (65)m= 95.13 84.47 | 90.17 | 82.85 | 82.66 | 75.96 | 74.96 | 79.49 | 78.49 | 85.81 | 88.2 | 93.53 |] | (65) |
| (65)m= 95.13 84.47 include (57)m in calc | LL | 82.85 | 82.66 | 75.96 | 74.96 | 79.49 | 78.49 | 85.81 | 88.2 | 93.53 | | (65) |
| ` ' | culation of | 82.85 f (65)m | 82.66 only if c | 75.96 | 74.96 | 79.49 | 78.49 | 85.81 | 88.2 | 93.53 | | (65) |
| include (57)m in calc 5. Internal gains (see | culation of | 82.85 f (65)m and 5a) | 82.66 only if c | 75.96 | 74.96 | 79.49 | 78.49 | 85.81 | 88.2 | 93.53 | | (65) |
| include (57)m in cald | culation of | 82.85 f (65)m and 5a) | 82.66 only if c | 75.96 | 74.96 | 79.49 | 78.49 | 85.81 | 88.2 | 93.53 | | (65) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table | culation of Table 5 at 25, Watts | 82.85 f (65)m and 5a) | 82.66 only if c | 75.96 ylinder i | 74.96 s in the o | 79.49 dwelling | 78.49 or hot w | 85.81 ater is fr | 88.2 | 93.53 munity h | | (65) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb | culation of Table 5: | 82.85 f (65)m and 5a) s Apr 150.73 | 82.66 only if c : May 150.73 | 75.96 ylinder is Jun 150.73 | 74.96 s in the o | 79.49 dwelling Aug 150.73 | 78.49 or hot w Sep 150.73 | 85.81 ater is fr | 88.2 com com | 93.53 munity h | | |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 | culation of Table 5: | 82.85 f (65)m and 5a) s Apr 150.73 | 82.66 only if c | 75.96 ylinder is Jun 150.73 | 74.96 s in the o | 79.49 dwelling Aug 150.73 | 78.49 or hot w Sep 150.73 | 85.81 ater is fr | 88.2 com com | 93.53 munity h | | |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula | Table 5 a 5), Watts Mar 150.73 ted in App | 82.85 f (65)m and 5a) s Apr 150.73 pendix l 27.53 | 82.66 only if c : May 150.73 _, equati 20.58 | 75.96 ylinder is Jun 150.73 ion L9 of | 74.96 s in the o Jul 150.73 r L9a), a 18.77 | Aug 150.73 Iso see | 78.49 or hot w Sep 150.73 Table 5 32.75 | 85.81 ater is fr Oct 150.73 | 88.2 com com Nov 150.73 | 93.53 munity h | | (66) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 | culation of Table 5 : 5), Watts Mar 150.73 ted in App 36.36 culated in Approximately and the second | 82.85 f (65)m and 5a) S Apr 150.73 Dendix L 27.53 | 82.66 only if c : May 150.73 _, equati 20.58 | 75.96 ylinder is Jun 150.73 ion L9 of | 74.96 s in the o Jul 150.73 r L9a), a 18.77 | Aug 150.73 Iso see | 78.49 or hot w Sep 150.73 Table 5 32.75 | 85.81 ater is fr Oct 150.73 | 88.2 com com Nov 150.73 | 93.53 munity h | | (66) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula | culation of Table 5 (a) Fig. 150.73 (b) Table 150.73 (c) | 82.85 f (65)m and 5a) s Apr 150.73 pendix I 27.53 Append 311.82 | 82.66 only if c : May 150.73 _, equati 20.58 dix L, equal 288.22 | Jun 150.73 ion L9 of 17.37 uation L | 74.96 s in the o Jul 150.73 r L9a), a 18.77 13 or L1 251.22 | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74 | 78.49 or hot w Sep 150.73 Table 5 32.75 o see Tal 256.52 | 85.81 ater is fr Oct 150.73 41.58 ble 5 275.21 | 88.2 rom com Nov 150.73 | 93.53 munity h | | (66) (67) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula (68)m= 335.81 339.29 | culation of Table 5 (a) Fig. 150.73 (b) Table 150.73 (c) | 82.85 f (65)m and 5a) s Apr 150.73 pendix I 27.53 Append 311.82 | 82.66 only if c : May 150.73 _, equati 20.58 dix L, equal 288.22 | Jun 150.73 ion L9 of 17.37 uation L | 74.96 s in the o Jul 150.73 r L9a), a 18.77 13 or L1 251.22 | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74 | 78.49 or hot w Sep 150.73 Table 5 32.75 o see Tal 256.52 | 85.81 ater is fr Oct 150.73 41.58 ble 5 275.21 | 88.2 rom com Nov 150.73 | 93.53 munity h | | (66) (67) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula (68)m= 335.81 339.29 Cooking gains (calcula (69)m= 52.58 52.58 | culation of Table 5: 5), Watts Mar 150.73 ted in App 36.36 culated in 330.51 ated in App 52.58 | 82.85 f (65)m and 5a) s Apr 150.73 pendix I 27.53 Append 311.82 pendix 52.58 | 82.66 only if c : May 150.73 _, equati 20.58 dix L, equati 288.22 L, equat | 75.96 ylinder is Jun 150.73 ion L9 of 17.37 uation L 266.04 ion L15 | 74.96 s in the o Jul 150.73 r L9a), a 18.77 13 or L1 251.22 or L15a) | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74 , also se | 78.49 or hot w Sep 150.73 Table 5 32.75 see Tal 256.52 ee Table | 85.81 ater is fr Oct 150.73 41.58 ole 5 275.21 5 | 88.2 rom com Nov 150.73 48.53 | 93.53 munity h Dec 150.73 51.73 | | (66) (67) (68) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula (68)m= 335.81 339.29 Cooking gains (calcula | culation of Table 5: 5), Watts Mar 150.73 ted in App 36.36 culated in 330.51 ated in App 52.58 | 82.85 f (65)m and 5a) s Apr 150.73 pendix I 27.53 Append 311.82 pendix 52.58 | 82.66 only if c : May 150.73 _, equati 20.58 dix L, equati 288.22 L, equat | 75.96 ylinder is Jun 150.73 ion L9 of 17.37 uation L 266.04 ion L15 | 74.96 s in the o Jul 150.73 r L9a), a 18.77 13 or L1 251.22 or L15a) | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74 , also se | 78.49 or hot w Sep 150.73 Table 5 32.75 see Tal 256.52 ee Table | 85.81 ater is fr Oct 150.73 41.58 ole 5 275.21 5 | 88.2 rom com Nov 150.73 48.53 | 93.53 munity h Dec 150.73 51.73 | | (66) (67) (68) |
| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula (68)m= 335.81 339.29 Cooking gains (calcula (69)m= 52.58 52.58 Pumps and fans gains (70)m= 0 0 | culation of Table 5: Table 5: Solution of Table 5: Solution of Table 5: Mar 150.73 ted in App 36.36 culated in App 330.51 ated in App 52.58 (Table 5: 0 | 82.85 f (65)m and 5a) s Apr 150.73 Dendix l 27.53 Appendix 52.58 a) 0 | 82.66 only if c May 150.73 -, equati 20.58 dix L, equ 288.22 L, equat 52.58 | 75.96 ylinder is Jun 150.73 ion L9 of 17.37 uation L 266.04 ion L15 52.58 | 74.96 s in the o Jul 150.73 r L9a), a 18.77 13 or L1 251.22 or L15a) 52.58 | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74), also se 52.58 | 78.49 or hot w Sep 150.73 Table 5 32.75 o see Tal 256.52 ee Table 52.58 | 85.81 Ater is from Oct 150.73 41.58 ble 5 275.21 5 52.58 | 88.2 com com Nov 150.73 48.53 | 93.53 munity h Dec 150.73 51.73 | | (66) (67) (68) (69) |
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| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula (68)m= 335.81 339.29 Cooking gains (calcula (69)m= 52.58 52.58 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporatio (71)m= -100.48 -100.48 | culation of Table 5 (Page 5), Watts Mar 150.73 ted in App 36.36 culated in App 52.58 (Table 5a 0 on (negative 100.48 culation of the first state o | 82.85 f (65)m and 5a) s Apr 150.73 pendix I 27.53 Appendix 52.58 a) 0 ve value | 82.66 only if c : May 150.73 -, equati 20.58 dix L, equ 288.22 L, equat 52.58 0 es) (Tab | 75.96 ylinder is Jun 150.73 ion L9 of 17.37 uation L 266.04 ion L15 52.58 0 le 5) | 74.96 s in the o Jul 150.73 r L9a), a 18.77 13 or L1 251.22 or L15a) 52.58 | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74), also se 52.58 | 78.49 or hot w Sep 150.73 Table 5 32.75 o see Tal 256.52 ee Table 52.58 | 85.81 ater is fr Oct 150.73 41.58 ole 5 275.21 5 52.58 | 88.2 com com Nov 150.73 48.53 298.81 | 93.53 munity h Dec 150.73 51.73 320.99 | | (66) (67) (68) (69) (70) |
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| include (57)m in calc 5. Internal gains (see Metabolic gains (Table Jan Feb (66)m= 150.73 150.73 Lighting gains (calcula (67)m= 50.33 44.71 Appliances gains (calcula (68)m= 335.81 339.29 Cooking gains (calcula (69)m= 52.58 52.58 Pumps and fans gains (70)m= 0 0 Losses e.g. evaporatio (71)m= -100.48 -100.48 Water heating gains (T (72)m= 127.87 125.7 Total internal gains = | culation of Table 5: Table 5: Solution of Table 5: Solution of Table 5: Mar | 82.85 f (65)m and 5a) s Apr 150.73 Dendix L 27.53 Appendix 52.58 a) 0 ve value -100.48 | 82.66 only if c May 150.73 _, equati 20.58 dix L, equ 288.22 L, equat 52.58 0 es) (Tab -100.48 | 75.96 ylinder is Jun 150.73 fon L9 of 17.37 uation L 266.04 fion L15 52.58 0 le 5) -100.48 105.5 (66) | 74.96 s in the of Jul 150.73 r L9a), a 18.77 13 or L1 251.22 or L15a) 52.58 0 -100.48 100.75 | 79.49 dwelling Aug 150.73 lso see 24.4 3a), also 247.74), also se 52.58 0 -100.48 | 78.49 or hot w Sep 150.73 Table 5 32.75 o see Tal 256.52 ee Table 52.58 0 -100.48 109.01 + (69)m + (| 85.81 ater is fr Oct 150.73 41.58 ole 5 275.21 5 52.58 0 -100.48 115.34 70)m + (7 | 88.2 rom com Nov 150.73 48.53 298.81 52.58 0 -100.48 122.5 1)m + (72) | 93.53 munity h Dec 150.73 51.73 320.99 52.58 0 -100.48 | | (66) (67) (68) (69) (70) (71) |

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

| | access Factor | r | Area m² | | Flux Table 6a | | g_ Table 6b | | FF Table 6c | | Gains (W) | |
|---------------------------|---------------|---|------------|---|------------------|---|----------------|---|----------------|-----|--------------|------|
| Southeast 0.9x | 0.77 | X | 0.72 | x | 36.79 | x | 0.4 | x | 0.8 | = | 5.87 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 36.79 | x | 0.4 | x | 0.8 | = | 13.14 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | х | 36.79 | x | 0.4 | x | 0.8 | = | 16.4 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 36.79 | x | 0.4 | x | 0.8 |] = | 7.43 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 62.67 | x | 0.4 | x | 0.8 | = | 10.01 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 62.67 | x | 0.4 | x | 0.8 | = | 22.38 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 62.67 | x | 0.4 | x | 0.8 | = | 27.94 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 62.67 | x | 0.4 | x | 0.8 | = | 12.65 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 85.75 | x | 0.4 | x | 0.8 | = | 13.69 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 85.75 | x | 0.4 | x | 0.8 | = | 30.62 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 85.75 | x | 0.4 | x | 0.8 | = | 38.22 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 85.75 | x | 0.4 | x | 0.8 | = | 17.31 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 106.25 | x | 0.4 | x | 0.8 | = | 16.96 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 106.25 | x | 0.4 | x | 0.8 | = | 37.94 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 106.25 | x | 0.4 | x | 0.8 | = | 47.36 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 106.25 | x | 0.4 | x | 0.8 | = | 21.44 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 119.01 | x | 0.4 | x | 0.8 | = | 19 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 119.01 | x | 0.4 | x | 0.8 | = | 42.49 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 119.01 | X | 0.4 | X | 0.8 | = | 53.05 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 119.01 | x | 0.4 | x | 0.8 | = | 24.02 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 118.15 | x | 0.4 | x | 0.8 | = | 18.86 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 118.15 | x | 0.4 | X | 0.8 | = | 42.18 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 118.15 | x | 0.4 | x | 0.8 | = | 52.66 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 118.15 | x | 0.4 | x | 0.8 | = | 23.84 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 113.91 | X | 0.4 | X | 0.8 | = | 18.19 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 113.91 | X | 0.4 | X | 0.8 | = | 40.67 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 113.91 | X | 0.4 | x | 0.8 | = | 50.77 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | X | 113.91 | X | 0.4 | X | 0.8 | = | 22.99 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 104.39 | X | 0.4 | X | 0.8 | = | 16.67 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 104.39 | X | 0.4 | X | 0.8 | = | 37.27 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | X | 104.39 | X | 0.4 | X | 0.8 | = | 46.53 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 104.39 | X | 0.4 | X | 0.8 | = | 21.07 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 92.85 | X | 0.4 | x | 0.8 | = | 14.83 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 92.85 | X | 0.4 | x | 0.8 | = | 33.15 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 92.85 | x | 0.4 | x | 0.8 | = | 41.39 | (77) |
| Southeast _{0.9x} | 0.77 | X | 0.91 | x | 92.85 | x | 0.4 | x | 0.8 | = | 18.74 | (77) |
| Southeast _{0.9x} | 0.77 | X | 0.72 | x | 69.27 | x | 0.4 | x | 0.8 | = | 11.06 | (77) |
| Southeast _{0.9x} | 0.77 | X | 1.61 | x | 69.27 | x | 0.4 | x | 0.8 | = | 24.73 | (77) |
| Southeast _{0.9x} | 0.77 | X | 2.01 | X | 69.27 | × | 0.4 | x | 0.8 | = | 30.88 | (77) |

| Southeast 0.9x | 0.77 | 1 | 0.04 | 1 | 00.07 | 1 | 0.4 | l " | 0.0 | 1 _ | 40.00 | 7(77) |
|---------------------------|------|----------|------|----------|--------|----------|-----|-----|-----|----------|--------|---------------|
| Southeast 0.9x | 0.77 |] X] | 0.91 | X 1 | 69.27 | X 1 | 0.4 | X | 0.8 |] = 1 | 13.98 | (77) |
| Southeast 0.9x | 0.77 |] X] | 0.72 | X 1 | 44.07 | X 1 | 0.4 | X | 0.8 |] =] | 7.04 | (77) |
| Southeast 0.9x | 0.77 |] X] | 1.61 |] X] | 44.07 | X 1 | 0.4 | X | 0.8 |] = 1 | 15.73 | (77) |
| <u> </u> | 0.77 | X] | 2.01 | X | 44.07 | X | 0.4 | X | 0.8 | = | 19.64 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | X | 44.07 | X | 0.4 | X | 0.8 |] = 1 | 8.89 | (77) |
| Southeast 0.9x | 0.77 |] X | 0.72 | X | 31.49 | X | 0.4 | X | 0.8 |] = 1 | 5.03 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 31.49 | X | 0.4 | X | 0.8 |] = 1 | 11.24 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | X | 31.49 | X | 0.4 | X | 0.8 | = | 14.04 | <u> </u> (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | X | 31.49 | X | 0.4 | Х | 0.8 | = | 6.35 | <u> </u> (77) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 36.79 | _ | 0.4 | X | 0.8 | = | 7.34 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 62.67 | | 0.4 | X | 0.8 | = | 12.51 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 85.75 | _ | 0.4 | X | 0.8 | = | 17.11 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 106.25 | <u> </u> | 0.4 | X | 0.8 | = | 21.21 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 119.01 | | 0.4 | X | 0.8 | = | 23.75 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 118.15 | | 0.4 | X | 0.8 | = | 23.58 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 113.91 |] | 0.4 | X | 0.8 | = | 22.73 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 104.39 |] | 0.4 | X | 0.8 | = | 20.83 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 92.85 | | 0.4 | X | 0.8 | = | 18.53 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | x | 69.27 |] | 0.4 | X | 0.8 | = | 13.82 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 44.07 | | 0.4 | X | 0.8 | = | 8.8 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 31.49 |] | 0.4 | X | 0.8 | = | 6.28 | (79) |
| Northwest _{0.9x} | 0.77 | X | 5.95 | x | 11.28 | x | 0.4 | x | 0.8 | = | 14.89 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | X | 11.28 | x | 0.4 | x | 0.8 | = | 4.98 | (81) |
| Northwest _{0.9x} | 0.77 | X | 0.9 | x | 11.28 | x | 0.4 | X | 0.8 | = | 2.25 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.95 | x | 22.97 | х | 0.4 | X | 0.8 | = | 30.3 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | x | 22.97 | x | 0.4 | X | 0.8 | = | 10.14 | (81) |
| Northwest _{0.9x} | 0.77 | X | 0.9 | x | 22.97 | x | 0.4 | x | 0.8 | = | 4.58 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.95 | x | 41.38 | x | 0.4 | X | 0.8 | = | 54.6 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | x | 41.38 | x | 0.4 | x | 0.8 |] = | 18.26 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | x | 41.38 | x | 0.4 | x | 0.8 |] = | 8.26 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | x | 67.96 | x | 0.4 | x | 0.8 | = | 89.67 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | x | 67.96 | x | 0.4 | x | 0.8 |] = | 29.99 | (81) |
| Northwest 0.9x | 0.77 | x | 0.9 | x | 67.96 | x | 0.4 | x | 0.8 | = | 13.56 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | x | 91.35 | х | 0.4 | х | 0.8 | j = | 120.53 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | x | 91.35 | х | 0.4 | х | 0.8 | j = | 40.31 | (81) |
| Northwest _{0.9x} | 0.77 | X | 0.9 | x | 91.35 | x | 0.4 | х | 0.8 | j = | 18.23 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.95 | x | 97.38 | x | 0.4 | x | 0.8 | j = | 128.5 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | x | 97.38 | x | 0.4 | x | 0.8 | j = | 42.98 | (81) |
| Northwest _{0.9x} | 0.77 | × | 0.9 | × | 97.38 | x | 0.4 | х | 0.8 | j = | 19.44 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | × | 91.1 | x | 0.4 | x | 0.8 | i = | 120.21 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | X | 91.1 | x | 0.4 | x | 0.8 | = | 40.2 | (81) |
| L_ | | 1 | | | | 1 | | 1 | | | | |

| Northwest 0.9x | 0.77 | X | 0.9 | 9 | x | 9 | 91.1 | x | 0.4 | x | 0.8 | = | 18.18 | (81) |
|--|--|--|--|---|--|---|--|---|---|--|---|---|-------|--|
| Northwest _{0.9x} | 0.77 | X | 5.9 | 95 | x | 72 | 2.63 | x | 0.4 | x | 0.8 | | 95.83 | (81) |
| Northwest 0.9x | 0.77 | X | 1.9 | 99 | x | 72 | 2.63 | x | 0.4 | × | 0.8 | = | 32.05 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | x | 72 | 2.63 | x | 0.4 | x | 0.8 | = | 14.5 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.9 | 95 | x | 50 | 0.42 | x | 0.4 | x | 0.8 | | 66.53 | (81) |
| Northwest 0.9x | 0.77 | x | 1.9 | 99 | x | 50 | 0.42 | x | 0.4 | x | 0.8 | _ = | 22.25 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | x | 50 | 0.42 | x | 0.4 | x | 0.8 | _ = | 10.06 | (81) |
| Northwest 0.9x | 0.77 | x | 5.9 | 95 | x | 28 | 8.07 | x | 0.4 | x | 0.8 | _ = | 37.03 | (81) |
| Northwest 0.9x | 0.77 | x | 1.9 | 99 | x | 28 | 8.07 | x | 0.4 | x | 0.8 | _ = | 12.39 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | x | 28 | 8.07 | x | 0.4 | × | 0.8 | = | 5.6 | (81) |
| Northwest 0.9x | 0.77 | x | 5.9 | 95 | x | 1 | 4.2 | x | 0.4 | × | 0.8 | _ = | 18.73 | (81) |
| Northwest 0.9x | 0.77 | X | 1.9 | 99 | X | 1 | 4.2 | x | 0.4 | × | 0.8 | = | 6.27 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | x | 1 | 4.2 | x | 0.4 | x | 0.8 | = | 2.83 | (81) |
| Northwest 0.9x | 0.77 | X | 5.9 | 95 | x | 9 | 9.21 | x | 0.4 | × | 0.8 | = | 12.16 | (81) |
| Northwest 0.9x | 0.77 | X | 1.9 | 99 | x | 9 | 9.21 | x | 0.4 | × | 0.8 | = | 4.07 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | x | 9 | 9.21 | x | 0.4 | x | 0.8 | | 1.84 | (81) |
| | | | | | | | | | | | | | | |
| Solar gains in | watts, cal | culated | for eacl | h mont | h | | | (83)m | n = Sum(74)m | (82)m | 1 | | | |
| (83)m= 72.3 | 130.5 | 198.07 | 278.13 | 341.38 | \neg | 52.04 | 333.94 | 284 | .74 225.48 | 149.4 | 9 87.94 | 61.01 |] | (83) |
| Total gains - i | nternal ar | nd solar | (84)m = | = (73)m | + (| 83)m , | watts | | • | • | • | • | - | |
| (84)m= 689.13 | 743.02 | 788.96 | 835.37 | 864.1 | 8 | 43.79 | 807.51 | 766 | .55 726.58 | 684.4 | 5 660.6 | 662.26 |] | (84) |
| 7. Mean inter | nal tempe | erature (| 'heating | | ·~ \ | | | | | | | | _ | |
| | | | neamy | Seasu | n) | | | | | | | | | |
| Temperature | • | ` | ` | | | area f | rom Tal | ole 9 | , Th1 (°C) | | | | 21 | (85) |
| • | during he | eating pe | eriods ir | n the liv | ing | | | ole 9 | , Th1 (°C) | | | | 21 | (85) |
| Temperature Utilisation fac | during he | eating pe | eriods ir | n the liv | ring m (s | | | | , Th1 (°C) | Oc | t Nov | Dec | 21 | (85) |
| Utilisation fac | during he | eating pe | eriods ir | n the liv | ring m (s | ee Tal | ble 9a) | | ug Sep | Oc 0.91 | + | Dec 0.99 | 21 | (85) |
| Utilisation factors Jan (86)m= 0.99 | during he ctor for ga Feb | eating periods ins for li Mar | eriods ir ving are Apr 0.89 | n the livea, h1,r May | ring m (s | ee Tal Jun ^{0.55} | Jul 0.4 | A 0.4 | ug Sep 14 0.68 | - | - | | 21 | |
| Utilisation factors Jan (86)m= 0.99 Mean interna | during he ctor for ga Feb 0.98 | eating period ins for li Mar 0.96 | eriods ir ving are Apr 0.89 iving are | n the livea, h1,r May 0.75 | ring m (s | ee Tal Jun 0.55 w ster | ble 9a) Jul 0.4 os 3 to 7 | A 0.4 7 in T | ug Sep 14 0.68 Table 9c) | 0.91 | 0.98 | 0.99 | 21 | (86) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 | during he ctor for ga Feb 0.98 I tempera | eating period ins for line Mar 0.96 otture in line 20.58 | eriods in ving are Apr 0.89 iving are 20.8 | n the livea, h1,r May 0.75 ea T1 (| ring m (s follo | ee Tal Jun 0.55 ow ster | Jul 0.4 os 3 to 7 | A 0.47 in T 2 | ug Sep 14 0.68 Table 9c) 1 20.98 | - | 0.98 | | 21 | |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 Temperature | during he ctor for ga Feb 0.98 I tempera 20.4 during he | eating period ins for line Mar 0.96 liture in line 20.58 leating period line 20.58 leating period line 20.58 leating period line 20. | eriods ir iving are Apr 0.89 iving are 20.8 eriods ir | n the lives a, h1,r May 0.75 ea T1 (20.94 | ring m (s follo | ee Tal Jun 0.55 ow ster 20.99 | Jul 0.4 os 3 to 7 21 from Ta | A 0.47 in T 2 able 9 | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) | 0.91 | 0.98 | 0.99 | 21 | (86) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 | during he ctor for ga Feb 0.98 I tempera | eating period ins for line Mar 0.96 otture in line 20.58 | eriods in ving are Apr 0.89 iving are 20.8 | n the livea, h1,r May 0.75 ea T1 (| ring m (s follo | ee Tal Jun 0.55 ow ster | Jul 0.4 os 3 to 7 | A 0.47 in T 2 | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) | 0.91 | 0.98 | 0.99 | 21 | (86) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 Temperature | during he ctor for ga Feb 0.98 I tempera 20.4 during he | eating period ins for line Mar 0.96 ture in line 20.58 eating period 20.15 | Apr 0.89 iving are 20.8 eriods ir | n the livea, h1,r May 0.75 ea T1 (20.94 n rest 0 20.16 | ring m (s | Jun 0.55 w step 20.99 velling | ble 9a) Jul 0.4 0s 3 to 7 21 from Ta 20.17 | A 0.47 in T 2 able 9 20. | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) | 0.91 | 0.98 | 0.99 | 21 | (86) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 Temperature (88)m= 20.14 | during he ctor for ga Feb 0.98 I tempera 20.4 during he | eating period ins for line Mar 0.96 ture in line 20.58 eating period 20.15 | Apr 0.89 iving are 20.8 eriods ir | n the livea, h1,r May 0.75 ea T1 (20.94 n rest 0 20.16 | ring (s | Jun 0.55 w step 20.99 velling | ble 9a) Jul 0.4 0s 3 to 7 21 from Ta 20.17 | A 0.47 in T 2 able 9 20. | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 | 0.91 | 0.98 | 0.99 | 21 | (86) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 | eating period ins for line at | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 | n the livea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 | ring m (s | Jun 0.55 ow step 20.99 velling 20.17 ,m (se 0.48 | Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 | A 0.47 in T 2 able 9 20. 9a) 0.3 | ug Sep 4 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 | 0.91 20.8 20.1 0.88 | 0.98 | 0.99 20.26 20.15 | 21 | (86) (87) (88) |
| Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors (89)m= 0.99 | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 | eating period ins for line at | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 | n the livea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 | ring (sm (s follow), h2, h2, h2, h2, h2, h2, h2, h2, h2, h2 | Jun 0.55 ow step 20.99 velling 20.17 ,m (se 0.48 | Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 | A 0.47 in T 2 able 9 20. 9a) 0.3 | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 to 7 in Tab | 0.91 20.8 20.1 0.88 | 0.98 1 20.52 6 20.16 0.97 | 0.99 20.26 20.15 | | (86) (87) (88) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors (89)m= 0.99 Mean interna | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera | eating periods for line for real control of the con | eriods ir Apr 0.89 iving are 20.8 eriods ir 20.16 est of do 0.87 he rest | n the lives, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 | ring (sm (s follow), h2, h2, h2, h2, h2, h2, h2, h2, h2, h2 | ee Tal Jun 0.55 www step 20.99 velling 20.17 mm (se 0.48 T2 (fc | Jul 0.4 os 3 to 7 21 from Ta 20.17 e Table 0.33 ollow ste | A 0.4 7 in T 2 20. 9a) 0.3 | ug Sep 4 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 to 7 in Tab 18 20.15 | 0.91 20.8 20.10 0.88 0.88 1e 9c) 19.90 | 0.98 1 20.52 6 20.16 0.97 | 0.99 20.26 20.15 0.99 | 21 | (86) (87) (88) (89) |
| Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors (89)m= 0.99 Mean internal (90)m= 19.2 | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera | eating period ins for II Mar 0.96 ture in II 20.58 eating period ins for reconstruction to 19.63 | eriods in ving are 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 he rest 19.94 | n the livea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwel 20.11 | ring (s follo | ee Tal Jun 0.55 www step 20.99 velling 20.17 ,m (se 0.48 T2 (fc 20.17 | Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste | A 0.4 7 in T 2 able 9 20. 9a) 0.3 | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 17 to 7 in Tab 18 20.15 | 0.91 20.8 20.10 0.88 0.88 1e 9c) 19.90 | 0.98 1 20.52 6 20.16 0.97 | 0.99 20.26 20.15 0.99 | | (86) (87) (88) (89) |
| Utilisation factors Jan (86)m= 0.99 Mean interna (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors (89)m= 0.99 Mean interna (90)m= 19.2 | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera | eating period ins for II Mar 0.96 ture in II 20.58 eating period ins for reconstruction to 19.63 | eriods in ving are 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 he rest 19.94 | n the livea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwel 20.11 | ring m (s follow 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | ee Tal Jun 0.55 www step 20.99 velling 20.17 ,m (se 0.48 T2 (fc 20.17 | Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste | A 0.4 7 in T 2 able 9 20. 9a) 0.3 | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 10 7 in Tab 18 20.15 - fLA) × T2 | 0.91 20.8 20.10 0.88 0.88 1e 9c) 19.90 | 0.98 1 20.52 6 20.16 0.97 6 19.55 ving area ÷ (- | 0.99 20.26 20.15 0.99 | | (86) (87) (88) (89) |
| Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors (89)m= 0.99 Mean internal (90)m= 19.2 Mean internal (92)m= 19.62 | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera 19.37 I tempera | eating period ins for line at | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 he rest 19.94 r the wh 20.28 | n the livea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwel 20.11 | ring m (s follo | ee Tal Jun 0.55 ow step 0.99 velling 0.17 m (se 0.48 T2 (fc 20.17 g) = fL | ble 9a) Jul 0.4 0.5 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste 20.17 A × T1 20.5 | A A 0.4 7 in T 2 20. 9a) 0.3 eps 3 20. + (1 | ug Sep 4 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 6 0.61 to 7 in Tab 18 20.15 - fLA) × T2 5 20.47 | 0.91 20.8 20.10 0.88 19.90 14.4 = Li 20.20 | 0.98 1 20.52 6 20.16 0.97 6 19.55 ving area ÷ (| 0.99 20.26 20.15 0.99 19.18 4) = | | (86) (87) (88) (89) (90) |
| Utilisation factors Jan (86)m= 0.99 Mean internal (87)m= 20.28 Temperature (88)m= 20.14 Utilisation factors (89)m= 0.99 Mean internal (90)m= 19.2 | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera 19.37 I tempera | eating period ins for line at | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 he rest 19.94 r the wh 20.28 | n the livea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwel 20.11 | ring m (s follows foll | ee Tal Jun 0.55 ow step 0.99 velling 0.17 m (se 0.48 T2 (fc 20.17 g) = fL | ble 9a) Jul 0.4 0.5 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste 20.17 A × T1 20.5 | A A 0.4 7 in T 2 20. 9a) 0.3 eps 3 20. + (1 | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 10 7 in Tab 18 20.15 - fLA) × T2 5 20.47 where appre | 0.91 20.8 20.10 0.88 19.90 14.4 = Li 20.20 | 0.98 1 20.52 6 20.16 0.97 6 19.55 ving area ÷ (| 0.99 20.26 20.15 0.99 19.18 4) = | | (86) (87) (88) (89) (90) |
| Utilisation factors Jan (86)m= | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera 19.37 I tempera 19.77 ment to the 19.77 | eating period ins for line at | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of dr 0.87 he rest 19.94 r the wh 20.28 internal | the live ea, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwell 20.11 | ring m (s follows foll | ee Tal Jun 0.55 w step 20.99 velling 20.17 m (se 0.48 T2 (fc 20.17 g) = fL 20.49 ure from | ble 9a) Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste 20.17 A × T1 20.5 m Table | A 0.4 O.4 O.5 O.5 O.5 O.5 O.5 O.5 O | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 10 7 in Tab 18 20.15 - fLA) × T2 5 20.47 where appre | 0.91 20.8 20.1 0.88 le 9c) 19.9 fLA = Li 20.2 | 0.98 1 20.52 6 20.16 0.97 6 19.55 ving area ÷ (| 0.99 20.26 20.15 0.99 19.18 4) = | | (86) (87) (88) (89) (90) (91) |
| Utilisation factors Jan | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera 19.37 I tempera 19.37 Interpera 19.77 ment to the 19.77 tting requi | eating periods for line for real line for line for real li | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of dr 0.87 he rest 19.94 r the wh 20.28 internal 20.28 | n the lives, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwelling 20.11 cole dwelling 20.44 I tempe 20.44 | ring m (s follow 2 fo | ee Tal Jun 0.55 ow step 20.99 velling 20.17 mm (se 0.48 T2 (fc 20.17 g) = fL 20.49 ure from 20.49 | ble 9a) Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste 20.17 A × T1 20.5 m Table 20.5 | A | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 10 7 in Tab 18 20.15 - fLA) × T2 5 20.47 where appre 5 20.47 | 0.91 20.8 20.1 0.88 le 9c) 19.9 fLA = Li 20.2 opriate 20.2 | 0.98 1 20.52 6 20.16 0.97 6 19.55 ving area ÷ (| 0.99 20.26 20.15 0.99 19.18 4) = 19.6 | 0.39 | (86) (87) (88) (89) (90) (91) |
| Utilisation factors Jan (86)m= | during he ctor for ga Feb 0.98 I tempera 20.4 during he 20.14 ctor for ga 0.97 I tempera 19.37 I tempera 19.77 ment to th 19.77 ting requirement interes | eating periods for lines for lines for real terms and lines for lines for real terms and lines for lines f | eriods in ving are Apr 0.89 iving are 20.8 eriods in 20.16 est of do 0.87 he rest 19.94 r the who 20.28 internal 20.28 | the lives, h1,r May 0.75 ea T1 (20.94 n rest o 20.16 welling 0.7 of dwel 20.11 cole dw 20.44 tempe 20.44 re obtain | ring m (s follow 2 fo | ee Tal Jun 0.55 ow step 20.99 velling 20.17 mm (se 0.48 T2 (fc 20.17 g) = fL 20.49 ure from 20.49 | ble 9a) Jul 0.4 0s 3 to 7 21 from Ta 20.17 e Table 0.33 bllow ste 20.17 A × T1 20.5 m Table 20.5 | A | ug Sep 14 0.68 Table 9c) 1 20.98 9, Th2 (°C) 18 20.17 16 0.61 10 7 in Tab 18 20.15 - fLA) × T2 5 20.47 where appre 5 20.47 | 0.91 20.8 20.1 0.88 le 9c) 19.9 fLA = Li 20.2 opriate 20.2 | 0.98 1 20.52 6 20.16 0.97 6 19.55 ving area ÷ (| 0.99 20.26 20.15 0.99 19.18 4) = 19.6 | 0.39 | (86) (87) (88) (89) (90) (91) |

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Mar

Jan

Feb

| The state of the s | | | | | | |
|--|---|--|--|--------------------------------|--|---|
| Utilisation factor for gains, hm: | 0.00 0.00 | 0.00 | 0.07 | | | (94) |
| (94)m= 0.98 0.97 0.94 0.87 0.72 0.51 0.36 0 Useful gains, hmGm , W = (94)m x (84)m | 0.39 0.63 | 0.88 | 0.97 | 0.99 | | (94) |
| | 300.54 461.02 | 604.99 | 638.61 | 652.88 | | (95) |
| Monthly average external temperature from Table 8 | | | | ļ | | |
| (96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 1 | 16.4 14.1 | 10.6 | 7.1 | 4.2 | | (96) |
| Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(| · · · · · · |] | | T | | |
| | 301.1 473.41 | 727.34 | 969.56 | 1171.88 | | (97) |
| Space heating requirement for each month, kWh/month = 0.024 x (98) m= 375.25 282.72 214.75 93.94 25.41 0 0 | i i |)m] x (4 ⁻ 91.03 | | 386.13 | | |
| (98)m= 375.25 282.72 214.75 93.94 25.41 0 0 | 0 0 Total per year | <u> </u> | 238.28 | Ь—— | 1707.51 | (98) |
| Space heating requirement in kWh/m²/year | rotal per year | (KWII/yeai |) = Odifi(3 | 0)15,912 | | = |
| Space heating requirement in kWh/m²/year | | | | <u> </u> | 20.65 | (99) |
| 9b. Energy requirements – Community heating scheme | a provided by | a aamm | unitu ook | 2000 | | |
| This part is used for space heating, space cooling or water heating Fraction of space heat from secondary/supplementary heating (Ta | | | unity Scr | neme. | 0 | (301) |
| Fraction of space heat from community system $1 - (301) =$ | | | | [| 1 | (302) |
| The community scheme may obtain heat from several sources. The procedure allo | ows for CHP and | up to four (| other heat | sources: th | ne latter | ` |
| includes boilers, heat pumps, geothermal and waste heat from power stations. See | | , | | | | |
| Fraction of heat from Community heat pump | | | | | 1 | (303a) |
| Fraction of total space heat from Community heat pump | | (3 | 02) x (303 | a) = | 1 | (304a) |
| Factor for control and charging method (Table 4c(3)) for communit | ity heating sys | tem | | [| 1 | (305) |
| | | | | | • | ` ′ |
| Distribution loss factor (Table 12c) for community heating system | | | | [[| 1.05 | (306) |
| Distribution loss factor (Table 12c) for community heating system Space heating | , , | | | [[| | (306) |
| · , , , , , , , , , , , , , , , , , , , | | | | ו [] | 1.05 | (306) |
| Space heating | | 04a) x (309 | 5) x (306) : | [- [| 1.05 kWh/yea | (306) |
| Space heating Annual space heating requirement | (98) x (30 | 04a) x (309 | , , , | - | 1.05 kWh/ye 1707.51 | (306) ar |
| Space heating Annual space heating requirement Space heat from Community heat pump | (98) x (30 Table 4a or A | 04a) x (309 | E) | [= [| 1.05 kWh/ye 1707.51 1792.89 | (306) ar (307a) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system) | (98) x (30 Table 4a or A | 04a) x (309 ppendix | E) | - [[| 1.05 kWh/yes 1707.51 1792.89 | (306) ar (307a) (308 |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from | (98) x (30 Table 4a or A | 04a) x (309 ppendix | E) | - | 1.05 kWh/yes 1707.51 1792.89 | (306) ar (307a) (308 |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: | (98) x (30 Table 4a or A m (98) x (30 | 04a) x (309 ppendix 01) x 100 - | E) - (308) = | []] | 1.05 kWh/yes 1707.51 1792.89 0 0 2127.66 | (306) ar (307a) (308 (309) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) | 04a) x (309 ppendix 01) x 100 - | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yes 1707.51 1792.89 0 | (306) ar (307a) (308 (309) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: | (98) x (30 Table 4a or A m (98) x (30 | 04a) x (309 ppendix 01) x 100 - | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yes 1707.51 1792.89 0 0 2127.66 | (306) ar (307a) (308 (309) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) | 04a) x (309 ppendix 01) x 100 - | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yes 1707.51 1792.89 0 0 2127.66 | (306) ar (307a) (308 (309) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) | 04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) + | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yes 1707.51 1792.89 0 0 2127.66 2234.04 40.27 | (306) ar (307a) (308 (309) (310a) (313) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) 0.01 x [(307a) | 04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) + | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yes 1707.51 1792.89 0 0 2127.66 2234.04 40.27 0 | (306) ar (307a) (308 (309) (310a) (313) (314) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) 0.01 x [(307a) | 04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) + | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yei 1707.51 1792.89 0 0 2127.66 2234.04 40.27 0 0 | (306) ar (307a) (308 (309) (310a) (313) (314) (315) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) 0.01 x [(307a) | 04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) + | E) = (308) = (5) x (306) = | [[= | 1.05 kWh/yei 1707.51 1792.89 0 0 2127.66 2234.04 40.27 0 0 229.32 | (306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our warm air heating system fans | (98) x (30) Table 4a or A m (98) x (30) (64) x (30) 0.01 x [(307a)) = (107) ÷ | 04a) x (309 ppendix 01) x 100 - 03a) x (309 (307e) + | E) - (308) = - (5) x (306) = - (310a)(| [[= | 1.05 kWh/yei 1707.51 1792.89 0 0 2127.66 2234.04 40.27 0 0 229.32 0 | (306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b) |

| | endix L) | | | 355.57 | (332) |
|--|---|----------------------------|--------------------------------|--------------------------------------|-------------------------|
| Total delivered energy for all uses (30 | 07) + (309) + (310) + (3 | 12) + (315) + (331) | + (332)(237b) = | 4611.82 | (338) |
| 10b. Fuel costs – Community heating | g scheme | | | | |
| | Fuel kWh/ye | ar | Fuel Price (Table 12) | Fuel Cost £/year | |
| Space heating from CHP | (307a) x | | 4.24 × 0.01 = | 76.02 | (340a) |
| Water heating from CHP | (310a) x | | 4.24 × 0.01 = | 94.72 | (342a) |
| Dumna and fana | (331) | | Fuel Price x 0.01 = | | 7,0,00 |
| Pumps and fans | (332) | | 10.10 | 30.23 | (349) |
| Energy for lighting | | | 13.19 X 0.01 = | +0.5 | (350) |
| Additional standing charges (Table 12 | <u>~)</u> | | | 120 | (351) |
| Total energy cost | = (340a)(342e) + (345 |)(354) = | | 367.89 | (355) |
| 11b. SAP rating - Community heating | g scheme | | | | |
| Energy cost deflator (Table 12) | | | | 0.42 | (356) |
| Energy cost factor (ECF) | [(355) x (356)] ÷ [(4) + 45 | 5.0] = | | 1.21 | (357) |
| SAP rating (section12) | | | | 83.12 | (358) |
| 12b. CO2 Emissions – Community he | eating scheme | Energy | Emission factor | Emissiens | |
| | | Energy kWh/year | kg CO2/kWh | kg CO2/year | |
| CO2 from other sources of space and Efficiency of heat source 1 (%) | | | 63) to (366) for the second fu | el 383 | (367a) |
| CO2 associated with heat source 1 | [(307 | 'b)+(310b)] x 100 ÷ (367l | o) x 0.52 | = 545.69 | (367) |
| Electrical energy for heat distribution | | [(313) x | 0.52 | = 20.9 | (372) |
| Total CO2 associated with community | y systems | (363)(366) + (368) | (372) | = 566.59 | (373) |
| CO2 associated with space heating (s | secondary) | (309) x | 0 | = 0 | (374) |
| CO2 associated with water from imme | ersion heater or instanta | aneous heater (312 | 2) x 0.22 | = 0 | (375) |
| Total CO2 associated with space and | I water heating | (373) + (374) + (375) | = | 566.59 | (376) |
| Total 002 accorated with opace and | | | | | |
| CO2 associated with electricity for pur | mps and fans within dw | velling (331)) x | 0.52 | = 119.02 | (378) |
| · | · | relling (331)) x (332))) x | 0.52 | = 119.02 = 184.54 | (378) |
| CO2 associated with electricity for pur | · | | | 119.02 | Ⅎ` |
| CO2 associated with electricity for pur | hting | | | = 184.54 | (379) |
| CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year | hting sum of (376)(382) = | | | = 184.54 | (379) |
| CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year Dwelling CO2 Emission Rate | hting sum of (376)(382) = (383) ÷ (4) = | (332))) x | 0.52 | = 184.54 870.14 10.52 90.87 | (379) (383) (384) |
| CO2 associated with electricity for pur CO2 associated with electricity for light Total CO2, kg/year Dwelling CO2 Emission Rate El rating (section 14) | hting sum of (376)(382) = (383) ÷ (4) = | | | = 184.54 870.14 10.52 | (379) (383) (384) |

| Energy associated with heat source 1 | [(307b)+(310b)] x 100 ÷ (367b) x | 3.07 | = | 3227.85 | (367) |
|---|----------------------------------|------|---|---------|-------|
| Electrical energy for heat distribution | [(313) x | | = | 123.63 | (372) |
| Total Energy associated with community systems | (363)(366) + (368)(372) | | = | 3351.48 | (373) |
| if it is negative set (373) to zero (unless specified oth | nerwise, see C7 in Appendix C) | | | 3351.48 | (373) |
| Energy associated with space heating (secondary) | (309) x | 0 | = | 0 | (374) |
| Energy associated with water from immersion heater o | r instantaneous heater(312) x | 1.22 | = | 0 | (375) |
| Total Energy associated with space and water heating | (373) + (374) + (375) = | | | 3351.48 | (376) |
| Energy associated with space cooling | (315) x | 3.07 | = | 0 | (377) |
| Energy associated with electricity for pumps and fans v | vithin dwelling (331)) x | 3.07 | = | 704.02 | (378) |
| Energy associated with electricity for lighting | (332))) x | 3.07 | = | 1091.6 | (379) |
| Total Primary Energy, kWh/year sur | n of (376)(382) = | | | 5147.1 | (383) |

| | | l Iser [| Details: | | | | |
|---|---|-------------------|--|------------------|---------------|-----------------------|----------|
| Assessor Name: | Ben Talbutt | 0301 1 | Stroma Nu | mber: | STRO | 036639 | |
| Software Name: | Stroma FSAP 2012 | | Software V | | | n: 1.0.5.17 | |
| | | Property | Address: D1-0 | 1 | | | |
| Address : | | | | | | | |
| 1. Overall dwelling dime | nsions: | | | | | | |
| | | Are | a(m²) | Av. Hei | | Volume(m ³ | <u>-</u> |
| Ground floor | | 4 | 42.39 (1a) x | 2.8 | (2a) = | 119.54 | (3a) |
| First floor | | 4 | 40.31 (1b) > | 3. | 15 (2b) = | 126.98 | (3b) |
| Total floor area TFA = (1a | a)+(1b)+(1c)+(1d)+(1e)+. | (1n) | 82.7 (4) | | _ | | |
| Dwelling volume | | | (3a)+(| (3b)+(3c)+(3d) | +(3e)+(3n) = | 246.52 | (5) |
| 2. Ventilation rate: | | | | | | | |
| | | ondary ting | other | total | | m³ per hou | ır |
| Number of chimneys | 0 + | 0 + | 0 = | 0 | x 40 = | 0 | (6a) |
| Number of open flues | 0 + | 0 + | 0 = | 0 | x 20 = | 0 | (6b) |
| Number of intermittent fa | ns | | | 0 | x 10 = | 0 | (7a) |
| Number of passive vents | | | | 0 | x 10 = | 0 | (7b) |
| Number of flueless gas fi | res | | | 0 | x 40 = | 0 | (7c) |
| | | | | | | | _ |
| | | | | | Air ch — | anges per ho | our — |
| Infiltration due to chimney | • | | | 0 | ÷ (5) = | 0 | (8) |
| Number of storeys in the | een carried out or is intended, ¡ ne dwelling (ns) | proceed to (17), | otnerwise continue | e trom (9) to (1 | (6) | 0 | (9) |
| Additional infiltration | io awoming (no) | | | | [(9)-1]x0.1 = | 0 | (10) |
| Structural infiltration: 0. | 25 for steel or timber fram | me or 0.35 fo | r masonry con | struction | ., . | 0 | (11) |
| if both types of wall are pr deducting areas of openir | resent, use the value correspondas): if equal user 0.35 | nding to the grea | ter wall area (after | | | | _ |
| • | loor, enter 0.2 (unsealed) | or 0.1 (seal | ed), else enter | 0 | | 0 | (12) |
| If no draught lobby, ent | er 0.05, else enter 0 | | | | | 0 | (13) |
| Percentage of windows | and doors draught strip | ped | | | | 0 | (14) |
| Window infiltration | | | 0.25 - [0.2 x (14) | ÷ 100] = | | 0 | (15) |
| Infiltration rate | | | (8) + (10) + (11) - | + (12) + (13) + | (15) = | 0 | (16) |
| Air permeability value, | q50, expressed in cubic | metres per h | our per square | metre of er | nvelope area | 3 | (17) |
| If based on air permeabil | ty value, then $(18) = [(17) =$ | - 20]+(8), otherw | vise (18) = (16) | | | 0.15 | (18) |
| | s if a pressurisation test has be | en done or a de | gree air permeabil | lity is being us | ed | | _ |
| Number of sides sheltere | d | | (20) – 1 [0.075] | v (10)1 – | | 2 | (19) |
| Shelter factor | ing abolto-ft | | $(20) = 1 - [0.075]$ $(24) = (18) \times (20)$ | | | 0.85 | (20) |
| Infiltration rate incorporat | | | $(21) = (18) \times (20)$ | = | | 0.13 | (21) |
| Infiltration rate modified for | | lun lui | Λι Ο - | n O-4 | Nov. Dec | | |
| | | Jun Jul | Aug Se | p Oct | Nov 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 (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 | | |
| Adjusted infiltr | ation rate | e (allowi | na for st | nelter an | d wind s | speed) = | : (21a) x | (22a)m | - | | | • | |
| 0.16 | 0.16 | 0.16 | 0.14 | 0.14 | 0.12 | 0.12 | 0.12 | 0.13 | 0.14 | 0.14 | 0.15 | | |
| Calculate effec | | _ | rate for t | he appli | cable ca | ise | 1 | 1 | 1 | | 1 | l | |
| If mechanica | | | endix N (2 | (23a) = (23a | a) × Fmv (| equation (| N5)) othe | rwise (23h | n) = (23a) | | | 0.5 | (23a) |
| If balanced with | | 0 | | , , | , | | ,, . | • |) = (25a) | | | 74.8 | (23b) |
| a) If balance | | , | , | J | | ` | | , | 2h)m + (| 23h) x [| 1 <i>– (2</i> 3c) | | (230) |
| (24a)m= 0.29 | 0.29 | 0.28 | 0.27 | 0.26 | 0.25 | 0.25 | 0.24 | 0.25 | 0.26 | 0.27 | 0.28 | | (24a) |
| b) If balance | ed mecha | anical ve | ntilation | without | heat red | covery (ľ | u MV) (24k | (22) | 2b)m + (| 23b) | | | |
| (24b)m= 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (24b) |
| c) If whole h | ouse ex | tract ven | tilation o | or positiv | e input | ventilatio | on from (| outside | | | | l | |
| if (22b)n | n < 0.5 × | (23b), t | hen (24 | c) = (23b |); other | wise (24 | c) = (22l | b) m + 0. | .5 × (23b | o) | | | |
| (24c)m= 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (24c) |
| d) If natural if (22b)n | | | | • | • | | | loft 22b)m² x | 0.5] | | | | |
| (24d)m= 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (24d) |
| Effective air | change | rate - en | iter (24a |) or (24k | o) or (24 | c) or (24 | ld) in bo | x (25) | | | | | |
| (25)m= 0.29 | 0.29 | 0.28 | 0.27 | 0.26 | 0.25 | 0.25 | 0.24 | 0.25 | 0.26 | 0.27 | 0.28 | | (25) |
| 3. Heat losse | s and he | eat loss p | paramet | er: | | | | | | | | | |
| ELEMENT | Cros | | | | | | | | | | | | |
| | Gros area | _ | Openin m | - | Net Ar ı, A | | U-val W/m2 | | A X U (W/ | | k-value kJ/m²·ł | | A X k kJ/K |
| Doors | | _ | • | - | | m² | | | | K) | | | |
| Doors Windows Type | area | _ | • | - | Α ,ι | m ² x | W/m2 | 2K = | (W/ | K) | | | kJ/K |
| | area | _ | • | - | A ,ı | m² x x1 | W/m2 1.48 | 2K = - 0.04] = | (W/ 3.7296 | K) | | | kJ/K (26) |
| Windows Type | area e 1 e 2 | _ | • | - | A ,1 2.52 0.72 | m² x x1 x1 | W/m2 1.48 /[1/(1.4)+ | 2K = -0.04] = -0.04] = | 3.7296 0.95 | K) | | | kJ/K (26) (27) |
| Windows Type | area | _ | • | - | A ,1 2.52 0.72 | m ² x x1 x1 x1 | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ | 2K = -0.04] = -0.0 | (W/ 3.7296 0.95 2.13 | K) | | | kJ/K (26) (27) (27) |
| Windows Type Windows Type Windows Type | area | _ | • | - | A ,1 2.52 0.72 1.61 2.01 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = - 0.04] = - 0.04] = - 0.04] = - 0.04] = | (W// 3.7296 0.95 2.13 2.66 | K) | | | kJ/K (26) (27) (27) (27) |
| Windows Type Windows Type Windows Type | area | _ | • | - | A ,1 2.52 0.72 1.61 2.01 0.91 | m ² | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = - 0.04] = | (W// 3.7296 0.95 2.13 2.66 1.21 | K) | | | kJ/K (26) (27) (27) (27) (27) |
| Windows Type Windows Type Windows Type Windows Type | area | _ | • | - | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = -0.04 = -0.0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) |
| Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type | area 2 2 3 4 4 5 5 6 6 7 | _ | • | - | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = -0.04 = -0.0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) |
| Windows Type | area 2 2 3 4 4 5 5 6 6 7 | _ | • | - | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 | m ² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = -0.04 = -0.0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) |
| Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type | area 2 2 3 4 4 5 5 6 6 7 | (m²) | • | ļ2 | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 | m² x1 | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = 0.04] = 0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) |
| Windows Type Floor | area area area area area area area area | (m²) | m | ļ2 | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 0.9 42.39 | m² x1 | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = 0.04] = 0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Floor Walls Type1 | area 1 2 3 4 4 5 6 6 7 8 8 | (m²) | 17.5 | ļ2 | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 | m² | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = 0.04] = 0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Floor Walls Type1 Walls Type2 | area 1 2 3 4 4 5 6 6 7 8 8 | (m²) | 17.5 | ļ2 | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 | m² x1 x1 x1 x1 x1 x1 x1 x2 x1 x2 x1 x2 x1 x2 | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | 2K = 0.04] = 0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 | K) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type Walls Type1 Walls Type2 Total area of e | area 2 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 95.6 12.9 | 6 19 , m² | 17.5 | indow U-va | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 150.9 150.9 56.48 alue calcul | m² x1 x1 x1 x1 x1 x1 x1 x2 x1 x2 x1 | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.1 0.14 0.2 | 2K = -0.04 = -0.0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 2.6 | K) 5 | kJ/m²-ŀ | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (28) (29) (29) |
| Windows Type Tloor Walls Type1 Walls Type2 Total area of e Party wall * for windows and | area area | (m²) 6 9 , m² ows, use e sides of in | 17.5 0 | indow U-va | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 150.9 150.9 56.48 alue calcul | m² x1 x1 x1 x1 x1 x1 x1 x2 x1 x2 x1 | W/m2 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.1 0.14 0.2 | 2K = -0.04 = -0.0 | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 2.6 | K) 5 | kJ/m²-ŀ | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (28) (29) (29) |
| Windows Type Tloor Walls Type1 Walls Type2 Total area of e Party wall * for windows and ** include the area | area area area area area area area area | 6 19 , m² ows, use e sides of in = S (A x | 17.5 0 | indow U-va | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 150.9 150.9 56.48 alue calcul | m² x1 x1 x1 x1 x1 x1 x1 x2 x1 x2 x1 | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.1 0.14 0.2 | 2K = 0.04] = -0.04] | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 2.6 | K) | kJ/m²-l | | kJ/K (26) (27) (27) (27) (27) (27) (27) (28) (29) (31) (32) |
| Windows Type Tloor Walls Type1 Walls Type2 Total area of e Party wall *for windows and ** include the area Fabric heat los | area area | (m²) 6 9 y, m² cows, use e sides of in = S (A x A x k) | 17.5 0 | 1 Indow U-vals and part | A ,1 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 150.9 56.48 alue calculatitions | m² x1 | W/m ² 1.48 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.1 0.14 0.2 | 2K = 0.04] = | (W// 3.7296 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 4.239 10.93 2.6 | K) 5 | kJ/m²-l | 3.2 | kJ/K (26) (27) (27) (27) (27) (27) (27) (28) (29) (29) (31) (32) |

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| Them billion of the wilder believe by the wilder by the wi | can be used insta- | ad of a de | tailed calc | ulation | | | | | | | | | | |
|--|--------------------|-------------|-------------|------------|----------------|------------|------------|-------------|------------|---------------|------------------------|---------|----------|------|
| Veletable of thermal bridging are not known (36) = 0.08 x (31) Total fabric heat loss (33) + (36) = (37) | | | | | usina An | pendix I | K | | | | | | 12.28 | (36) |
| Total labric heat loss calculated monthly | _ | , | • | | | • | | | | | | | 12.20 | (00) |
| Same | | | | , , | , | , | | | (33) + | (36) = | | | 53.65 | (37) |
| Same 23.47 23.22 22.96 21.66 21.4 20.1 20.1 19.84 20.62 21.4 21.92 22.44 (38) | Ventilation hea | at loss ca | alculated | l monthly | y | | | | (38)m | = 0.33 × (| 25)m x (5) |) | | |
| Heat transfer coefficient, W/K (39)m = (37) + (38)m (39)m = (77.13 78.87 78.61 75.31 75.05 73.75 73.57 73.57 73.57 74.27 75.05 75.57 76.09 **Average * Sum(39) ***\dark d(40)m = (39) ***\dark d(90)m = (39) **\dark d(90)m = (39) ***\dark d(90)m = (39) ***\dark d(90)m = (39) **\dark d(90)m = (| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | | |
| Case Fig. 1.13 Fig. 1.76 Fig. 1.76 Fig. 1.75 | (38)m= 23.47 | 23.22 | 22.96 | 21.66 | 21.4 | 20.1 | 20.1 | 19.84 | 20.62 | 21.4 | 21.92 | 22.44 | | (38) |
| Heat loss parameter (HLP), W/m²K | Heat transfer of | coefficier | nt, W/K | | - | - | - | | (39)m | = (37) + (37) | 38)m | - | • | |
| Heat loss parameter (HLP), W/m²K (40)m= 0.93 0.93 0.93 0.93 0.91 0.91 0.91 0.89 0.89 0.89 0.9 0.91 0.91 0.92 Average = Sum(40)z /12= 0.91 (40) Number of days in month (Table 1a) (41)m= 31 78 | (39)m= 77.13 | 76.87 | 76.61 | 75.31 | 75.05 | 73.75 | 73.75 | 73.5 | 74.27 | 75.05 | 75.57 | 76.09 | | |
| Average = Sum(40) 12 140 | Heat loss para | meter (H | HLP), W/ | ′m²K | | | | | | | | 12 /12= | 75.25 | (39) |
| Number of days in month (Table 1a) | (40)m= 0.93 | 0.93 | 0.93 | 0.91 | 0.91 | 0.89 | 0.89 | 0.89 | 0.9 | 0.91 | 0.91 | 0.92 | | |
| 4. Water heating energy requirement: Assumed occupancy, N | Number of day | s in mor | nth (Tab | le 1a) | | | | | | Average = | Sum(40) ₁ | 12 /12= | 0.91 | (40) |
| ### Assumed occupancy, N ### ITFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA - 13.9)2)] + 0.0013 x (TFA - 13.9) ### ITFA £ 13.9, N = 1 ### Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 ### Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) ### Jun | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | | |
| Assumed occupancy, N if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) if TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43) (44)m= 103.25 99.49 95.74 91.99 88.23 84.48 84.48 88.23 91.99 95.74 99.49 103.25 Total = Sum(44) = 1126.35 (44) Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables th, ct, d) (45)m= 153.11 133.92 138.19 120.48 115.6 99.75 92.44 106.07 107.34 125.09 136.55 148.28 It instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (48) Temperature factor from Table 2b 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | (41)m= 31 | 28 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 30 | 31 | | (41) |
| Assumed occupancy, N if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) if TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43) (44)m= 103.25 99.49 95.74 91.99 88.23 84.48 84.48 88.23 91.99 95.74 99.49 103.25 Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, c. td) (45)m= 153.11 133.92 138.19 120.48 115.6 99.75 92.44 106.07 107.34 125.09 136.55 148.28 It instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (48) Temperature factor from Table 2b 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a (19) | | | | | | | | | | | | | | |
| If TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) If TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd. average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec | 4. Water heat | ting ener | gy requi | rement: | | | | | | | | kWh/ye | ear: | |
| If TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) If TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd. average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec | Assumed occur | inancy I | NI. | | | | | | | | | F1 | 1 | (42) |
| Annual average hot water usage in litres per day Vd,average = (25 x N) + 36 | if TFA > 13.9 | 9, N = 1 | | [1 - exp | (-0.0003 | 849 x (TF | FA -13.9 |)2)] + 0.0 | 0013 x (| TFA -13. | .9) | .51 | | (42) |
| Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec | Annual averag | e hot wa | | | | | | | | | | 3.86 | | (43) |
| Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec | | _ | | | | _ | _ | to achieve | a water us | se target o | f | | | |
| Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43) (44)m= 103.25 99.49 95.74 91.99 88.23 84.48 84.48 88.23 91.99 95.74 99.49 103.25 Total = Sum(44): ve = 1126.35 (44) (45)m= 153.11 133.92 138.19 120.48 115.6 99.75 92.44 106.07 107.34 125.09 136.55 148.28 Total = Sum(45): ve = 1476.82 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | | | | | | | • | T . | 0 | | N | | | |
| (44)m 103.25 99.49 95.74 91.99 88.23 84.48 84.48 88.23 91.99 95.74 99.49 103.25 Total = Sum(44)_12 | | | | _ | | | | | Sep | Oct | INOV | Dec | | |
| Total = Sum(44)2 = 1126.35 (44) Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 153.11 133.92 138.19 120.48 115.6 99.75 92.44 106.07 107.34 125.09 136.55 148.28 Total = Sum(45)2 = 1476.82 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (48) Temperature factor from Table 2b 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | | | | | | | | | 91 99 | 95.74 | 99.49 | 103.25 | | |
| Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 153.11 133.92 138.19 120.48 115.6 99.75 92.44 106.07 107.34 125.09 136.55 148.28 Total = Sum(45) = 1476.82 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (48) Temperature factor from Table 2b 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | (44)111= 100.20 | 33.43 | 33.74 | 31.33 | 00.20 | 04.40 | 04.40 | 00.20 | | ļ. | | ļ | 1126.35 | (44) |
| If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (48) Temperature factor from Table 2b 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | Energy content of | hot water | used - cal | culated mo | onthly $= 4$. | 190 x Vd,r | m x nm x E | OTm / 3600 | | | (/ | | 1.120.00 | ` ′ |
| If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 22.97 20.09 20.73 18.07 17.34 14.96 13.87 15.91 16.1 18.76 20.48 22.24 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 0 (48) Temperature factor from Table 2b 0 (49) Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | (45)m= 153.11 | 133.92 | 138.19 | 120.48 | 115.6 | 99.75 | 92.44 | 106.07 | 107.34 | 125.09 | 136.55 | 148.28 | | |
| (46)m=22.9720.0920.7318.0717.3414.9613.8715.9116.118.7620.4822.24Water storage loss:Storage volume (litres) including any solar or WWHRS storage within same vessel0(47)If community heating and no tank in dwelling, enter 110 litres in (47)Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47)Water storage loss:a) If manufacturer's declared loss factor is known (kWh/day):0(48)Temperature factor from Table 2b0(49)Energy lost from water storage, kWh/year(48) x (49) =110(50)b) If manufacturer's declared cylinder loss factor is not known:Hot water storage loss factor from Table 2 (kWh/litre/day)0.02(51)If community heating see section 4.3Volume factor from Table 2a1.03(52) | | | | | | | | | | Total = Su | m(45) ₁₁₂ = | = | 1476.82 | (45) |
| Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel o (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (47) (47) (47) (47) (47) (48) (48) (49) (48) (49) (49) (49) (50) (51) | If instantaneous w | ater heatii | ng at point | of use (no | hot water | storage), | enter 0 in | boxes (46 |) to (61) | | , | , | • | |
| Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | ` ' | | 20.73 | 18.07 | 17.34 | 14.96 | 13.87 | 15.91 | 16.1 | 18.76 | 20.48 | 22.24 | | (46) |
| If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | _ | | includin | na anv so | olar or W | /WHRS | storage | within sa | ame ves | sel | | 0 | | (47) |
| Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (48) (48) (49) 110 0.02 (51) | • | ` , | | | | | _ | | | 00. | | 0 | | (, |
| a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (48) (48) × (49) = 0 0 (49) 50) 50) 51) | • | • | | | _ | | | ` ' | ers) ente | er '0' in (| 47) | | | |
| Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (49) (49) (50) (51) | Water storage | loss: | | | | | | | | | | | _ | |
| Energy lost from water storage, kWh/year (48) x (49) = 110 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0.02 (51) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | a) If manufact | urer's de | eclared l | oss facto | or is kno | wn (kWł | n/day): | | | | | 0 | | (48) |
| b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | Temperature fa | actor fro | m Table | 2b | | | | | | | | 0 | | (49) |
| Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | • | | - | - | | | | (48) x (49) |) = | | 1 | 10 | | (50) |
| If community heating see section 4.3 Volume factor from Table 2a 1.03 (52) | , | | | - | | | | | | | | 02 | | (51) |
| Volume factor from Table 2a 1.03 (52) | | - | | | - (IVVI | , 5, 40 | -1/ | | | | | .02 | l | (01) |
| Temperature factor from Table 2b 0.6 (53) | Volume factor | from Ta | ble 2a | | | | | | | | 1. | .03 | | (52) |
| | Temperature fa | actor fro | m Table | 2b | | | | | | | 0 | 0.6 | | (53) |

| Energy lost from water storage, kWh/year | (47) x (51) x (5 | (52) x (53) = | 1.0 | 03 | | (54) |
|--|---|--|---|--|---------------|--|
| Enter (50) or (54) in (55) | | | 1.0 | 03 | | (55) |
| Water storage loss calculated for each month | ((56)m = (55) | × (41)m | | | | |
| (56)m= 32.01 28.92 32.01 30.98 32.01 30.98 32 | 2.01 32.01 30 | 30.98 32.01 | 30.98 | 32.01 | | (56) |
| If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11) | i)] ÷ (50), else (57)m | = (56)m where (F | 111) is froi | m Appendi | x H | |
| (57)m= 32.01 28.92 32.01 30.98 32.01 30.98 32 | 2.01 32.01 30 | 32.01 | 30.98 | 32.01 | | (57) |
| Primary circuit loss (annual) from Table 3 | | | (|) | | (58) |
| Primary circuit loss calculated for each month (59)m = (58) |) ÷ 365 × (41)m | | | | | |
| (modified by factor from Table H5 if there is solar water h | heating and a cy | linder thermos | stat) | | | |
| (59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23 | 3.26 23.26 22 | 23.26 | 22.51 | 23.26 | | (59) |
| Combi loss calculated for each month (61)m = (60) ÷ 365 × | × (41)m | | | | | |
| (61)m= 0 0 0 0 0 | 0 0 | 0 0 | 0 | 0 | | (61) |
| Total heat required for water heating calculated for each me | nonth (62)m = 0.8 | 85 × (45)m + (| 46)m + | (57)m + | (59)m + (61)m | |
| (62)m= 208.39 183.84 193.47 173.97 170.88 153.25 14 | 47.71 161.35 16 | 60.83 180.37 | 190.04 | 203.56 | | (62) |
| Solar DHW input calculated using Appendix G or Appendix H (negative qu | quantity) (enter '0' if n | no solar contribution | on to wate | r heating) | | |
| (add additional lines if FGHRS and/or WWHRS applies, see | ee Appendix G) | | | | | |
| (63)m= 0 0 0 0 0 | 0 0 | 0 0 | 0 | 0 | | (63) |
| Output from water heater | | | | | | |
| (64)m= 208.39 183.84 193.47 173.97 170.88 153.25 14 | 47.71 161.35 16 | 60.83 180.37 | 190.04 | 203.56 | | |
| | Output fr | from water heater | (annual) _{1.} | 12 | 2127.66 | (64) |
| Heat gains from water heating, kWh/month 0.25 ´ [0.85 x (4 | (45)m + (61)m] + | - 0.8 x [(46)m - | + (57)m | + (59)m | 1 | |
| | | - ` ' | | ` ' | - | |
| (65)m= 95.13 84.47 90.17 82.85 82.66 75.96 74 | 4.96 79.49 78 | 85.81 | 88.2 | 93.53 | - | (65) |
| (65)m= 95.13 84.47 90.17 82.85 82.66 75.96 74 include (57)m in calculation of (65)m only if cylinder is in | | 8.49 85.81 | ļ | 93.53 | - | (65) |
| ` ' | | 8.49 85.81 | ļ | 93.53 | - | (65) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): | | 8.49 85.81 | ļ | 93.53 | - | (65) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts | the dwelling or h | 8.49 85.81 | ļ | 93.53 | - | (65) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun J | the dwelling or h | 8.49 85.81 hot water is fro | om comi | 93.53 munity he | - | (65) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug 5 25.6 125.6 12 | 78.49 85.81 hot water is from Sep Oct 25.6 125.6 | om comi | 93.53 munity ho | - | |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug S 25.6 125.6 12 9a), also see Tab | 78.49 85.81 hot water is from Sep Oct 25.6 125.6 | om comi | 93.53 munity ho | - | |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug 3 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 | 8.49 85.81 hot water is from Sep Oct 25.6 125.6 ole 5 | Nov 125.6 | 93.53 munity ho | - | (66) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se | 8.49 85.81 hot water is from Sep Oct 25.6 125.6 ole 5 | Nov 125.6 | 93.53 munity ho | - | (66) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 | Sep Oct 25.6 125.6 126.6 126.6 126.6 127.87 184.39 | Nov 125.6 | 93.53 munity ho Dec 125.6 | - | (66) (67) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug 5 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 L15a), also see T | Sep Oct 25.6 125.6 126.6 126.6 126.6 127.87 184.39 | Nov 125.6 | 93.53 munity ho Dec 125.6 | - | (66) (67) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug 3 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 L15a), also see T | Sep Oct 25.6 125.6 ole 5 13.1 16.63 ee Table 5 134.39 Table 5 | Nov 125.6 19.41 | 93.53 munity ho Dec 125.6 20.69 | - | (66) (67) (68) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug 3 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 L15a), also see T | Sep Oct 25.6 125.6 ole 5 13.1 16.63 ee Table 5 134.39 Table 5 | Nov 125.6 19.41 | 93.53 munity ho Dec 125.6 20.69 | - | (66) (67) (68) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 L15a), also see T 5.56 35.56 36 | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 | 93.53 munity ho Dec 125.6 20.69 215.06 | - | (66) (67) (68) (69) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also see 68.32 165.98 17 L15a), also see T 5.56 35.56 38 | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 35.56 | 93.53 munity ho Dec 125.6 20.69 215.06 0 | - | (66) (67) (68) (69) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also see 68.32 165.98 17 L15a), also see T 5.56 35.56 38 | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 35.56 | 93.53 munity ho Dec 125.6 20.69 215.06 | - | (66) (67) (68) (69) (70) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also see 68.32 165.98 17 L15a), also see T 5.56 35.56 38 | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 35.56 0 | 93.53 munity ho Dec 125.6 20.69 215.06 0 -100.48 | - | (66) (67) (68) (69) (70) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jun (66)m= 125.6 12 | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also see 68.32 165.98 17 L15a), also see T 5.56 35.56 36 0 0 | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 35.56 0 | 93.53 munity ho Dec 125.6 20.69 215.06 0 -100.48 | - | (66) (67) (68) (69) (70) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 L15a), also see T 5.56 35.56 36 0 0 0.048 -100.48 -10 0.0.75 106.84 10 - (67)m + (68)m + (69) | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 35.56 0 -100.48 | 93.53 munity ho Dec 125.6 20.69 215.06 35.56 0 -100.48 | - | (66) (67) (68) (69) (70) (71) |
| include (57)m in calculation of (65)m only if cylinder is in 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun | Jul Aug S 25.6 125.6 12 9a), also see Tab 7.51 9.76 1 or L13a), also se 68.32 165.98 17 L15a), also see T 5.56 35.56 38 0 0 0.048 -100.48 -10 0.0.75 106.84 10 - (67)m + (68)m + (69) | Sep Oct 25.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.6 125.5 | Nov 125.6 19.41 200.2 35.56 0 | 93.53 munity ho Dec 125.6 20.69 215.06 0 -100.48 | - | (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.

| | access Factor | r | Area m² | | Flux Table 6a | | g_ Table 6b | | FF Table 6c | | Gains (W) | |
|---------------------------|---------------|---|------------|---|------------------|---|----------------|---|----------------|-----|--------------|------|
| Southeast 0.9x | 0.77 | X | 0.72 | x | 36.79 | x | 0.4 | x | 0.8 | = | 5.87 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 36.79 | x | 0.4 | x | 0.8 | = | 13.14 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | х | 36.79 | x | 0.4 | x | 0.8 | = | 16.4 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 36.79 | x | 0.4 | x | 0.8 |] = | 7.43 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 62.67 | x | 0.4 | x | 0.8 | = | 10.01 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 62.67 | x | 0.4 | x | 0.8 | = | 22.38 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 62.67 | x | 0.4 | x | 0.8 | = | 27.94 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 62.67 | x | 0.4 | x | 0.8 | = | 12.65 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 85.75 | x | 0.4 | x | 0.8 | = | 13.69 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 85.75 | x | 0.4 | x | 0.8 | = | 30.62 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 85.75 | x | 0.4 | x | 0.8 | = | 38.22 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 85.75 | x | 0.4 | x | 0.8 | = | 17.31 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 106.25 | x | 0.4 | x | 0.8 | = | 16.96 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 106.25 | x | 0.4 | x | 0.8 | = | 37.94 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 106.25 | x | 0.4 | x | 0.8 | = | 47.36 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 106.25 | x | 0.4 | x | 0.8 | = | 21.44 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 119.01 | x | 0.4 | x | 0.8 | = | 19 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 119.01 | x | 0.4 | x | 0.8 | = | 42.49 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 119.01 | X | 0.4 | X | 0.8 | = | 53.05 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 119.01 | x | 0.4 | X | 0.8 | = | 24.02 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 118.15 | x | 0.4 | x | 0.8 | = | 18.86 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 118.15 | x | 0.4 | X | 0.8 | = | 42.18 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 118.15 | x | 0.4 | x | 0.8 | = | 52.66 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 118.15 | x | 0.4 | x | 0.8 | = | 23.84 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 113.91 | X | 0.4 | X | 0.8 | = | 18.19 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 113.91 | X | 0.4 | X | 0.8 | = | 40.67 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 113.91 | X | 0.4 | x | 0.8 | = | 50.77 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | X | 113.91 | X | 0.4 | X | 0.8 | = | 22.99 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 104.39 | X | 0.4 | X | 0.8 | = | 16.67 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 104.39 | X | 0.4 | X | 0.8 | = | 37.27 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | X | 104.39 | X | 0.4 | X | 0.8 | = | 46.53 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 104.39 | X | 0.4 | X | 0.8 | = | 21.07 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 92.85 | X | 0.4 | x | 0.8 | = | 14.83 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 92.85 | X | 0.4 | x | 0.8 | = | 33.15 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 92.85 | x | 0.4 | x | 0.8 | = | 41.39 | (77) |
| Southeast _{0.9x} | 0.77 | X | 0.91 | x | 92.85 | x | 0.4 | x | 0.8 | = | 18.74 | (77) |
| Southeast _{0.9x} | 0.77 | X | 0.72 | x | 69.27 | x | 0.4 | x | 0.8 | = | 11.06 | (77) |
| Southeast _{0.9x} | 0.77 | X | 1.61 | x | 69.27 | x | 0.4 | x | 0.8 | = | 24.73 | (77) |
| Southeast _{0.9x} | 0.77 | X | 2.01 | X | 69.27 | × | 0.4 | x | 0.8 | = | 30.88 | (77) |

| | | _ | | _ | | _ | | | | _ | | |
|---------------------------|------|---|------|---|--------|---|-----|---|-----|-----|--------|------|
| Southeast _{0.9x} | 0.77 | X | 0.91 | X | 69.27 | X | 0.4 | X | 0.8 | = | 13.98 | (77) |
| Southeast _{0.9x} | 0.77 | X | 0.72 | X | 44.07 | X | 0.4 | X | 0.8 | = | 7.04 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 44.07 | X | 0.4 | X | 0.8 | = | 15.73 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | X | 44.07 | x | 0.4 | X | 0.8 | = | 19.64 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | X | 44.07 | x | 0.4 | X | 0.8 | = | 8.89 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 31.49 | X | 0.4 | X | 0.8 | = | 5.03 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | X | 31.49 | x | 0.4 | x | 0.8 | = | 11.24 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | X | 31.49 | X | 0.4 | X | 0.8 | = | 14.04 | (77) |
| Southeast _{0.9x} | 0.77 | x | 0.91 | X | 31.49 | x | 0.4 | X | 0.8 | = | 6.35 | (77) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 36.79 |] | 0.4 | x | 0.8 | = | 7.34 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 62.67 | | 0.4 | X | 0.8 | = | 12.51 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 85.75 |] | 0.4 | X | 0.8 | = | 17.11 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 106.25 | | 0.4 | x | 0.8 | = | 21.21 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 119.01 | | 0.4 | X | 0.8 | = | 23.75 | (79) |
| Southwest _{0.9x} | 0.77 | X | 0.9 | X | 118.15 | | 0.4 | X | 0.8 | = | 23.58 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 113.91 |] | 0.4 | x | 0.8 |] = | 22.73 | (79) |
| Southwest _{0.9x} | 0.77 | х | 0.9 | X | 104.39 |] | 0.4 | x | 0.8 | = | 20.83 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 92.85 | | 0.4 | X | 0.8 | = | 18.53 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 69.27 |] | 0.4 | x | 0.8 | = | 13.82 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 44.07 |] | 0.4 | X | 0.8 | = | 8.8 | (79) |
| Southwest _{0.9x} | 0.77 | x | 0.9 | X | 31.49 | | 0.4 | x | 0.8 | = | 6.28 | (79) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | X | 11.28 | х | 0.4 | x | 0.8 | = | 14.89 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 11.28 | X | 0.4 | X | 0.8 |] = | 4.98 | (81) |
| Northwest _{0.9x} | 0.77 | x | 0.9 | X | 11.28 | x | 0.4 | X | 0.8 | = | 2.25 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | X | 22.97 | x | 0.4 | x | 0.8 | = | 30.3 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 22.97 | x | 0.4 | X | 0.8 | = | 10.14 | (81) |
| Northwest _{0.9x} | 0.77 | x | 0.9 | X | 22.97 | x | 0.4 | x | 0.8 | = | 4.58 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | X | 41.38 | x | 0.4 | x | 0.8 | = | 54.6 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 41.38 | x | 0.4 | X | 0.8 | = | 18.26 | (81) |
| Northwest 0.9x | 0.77 | x | 0.9 | X | 41.38 | x | 0.4 | x | 0.8 | = | 8.26 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | X | 67.96 | x | 0.4 | x | 0.8 | = | 89.67 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 67.96 | X | 0.4 | X | 0.8 | = | 29.99 | (81) |
| Northwest 0.9x | 0.77 | x | 0.9 | X | 67.96 | x | 0.4 | x | 0.8 | = | 13.56 | (81) |
| Northwest _{0.9x} | 0.77 | х | 5.95 | X | 91.35 | х | 0.4 | x | 0.8 | = | 120.53 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 91.35 | X | 0.4 | X | 0.8 | = | 40.31 | (81) |
| Northwest _{0.9x} | 0.77 | x | 0.9 | x | 91.35 | x | 0.4 | x | 0.8 |] = | 18.23 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | x | 97.38 | x | 0.4 | x | 0.8 |] = | 128.5 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 97.38 | x | 0.4 | x | 0.8 |] = | 42.98 | (81) |
| Northwest _{0.9x} | 0.77 | x | 0.9 | X | 97.38 | x | 0.4 | x | 0.8 | = | 19.44 | (81) |
| Northwest _{0.9x} | 0.77 | x | 5.95 | X | 91.1 | x | 0.4 | x | 0.8 | = | 120.21 | (81) |
| Northwest _{0.9x} | 0.77 | x | 1.99 | X | 91.1 | x | 0.4 | x | 0.8 |] = | 40.2 | (81) |
| | | | | | | | | | | | | |

| _ | | | | | | | | | | | | | | |
|---|--|--|---|--|--|--|--|---|--|--|---|---|-------|--|
| Northwest _{0.9x} | 0.77 | х | 0.9 | 9 | X | | 91.1 | x | 0.4 | X | 0.8 | = | 18.18 | (81) |
| Northwest 0.9x | 0.77 | X | 5.9 | 95 | X | 7 | 2.63 | x | 0.4 | X | 0.8 | = | 95.83 | (81) |
| Northwest 0.9x | 0.77 | X | 1.9 | 99 | X | 7 | 2.63 | x | 0.4 | X | 0.8 | = | 32.05 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | X | 7 | 2.63 | x | 0.4 | x | 0.8 | = | 14.5 | (81) |
| Northwest 0.9x | 0.77 | Х | 5.9 | 95 | X | 5 | 0.42 | x | 0.4 | x | 0.8 | = | 66.53 | (81) |
| Northwest 0.9x | 0.77 | x | 1.9 | 99 | X | 5 | 0.42 | x | 0.4 | x | 0.8 | = | 22.25 | (81) |
| Northwest 0.9x | 0.77 | x | 0.9 | 9 | X | 5 | 0.42 | x | 0.4 | x | 0.8 | = | 10.06 | (81) |
| Northwest 0.9x | 0.77 | x | 5.9 | 95 | X | 2 | 8.07 | x | 0.4 | x | 0.8 | _ = | 37.03 | (81) |
| Northwest _{0.9x} | 0.77 | х | 1.9 | 99 | X | 2 | 8.07 | x | 0.4 | x | 0.8 | = | 12.39 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 | 9 | X | 2 | 8.07 | x | 0.4 | × | 0.8 | | 5.6 | (81) |
| Northwest 0.9x | 0.77 | x | 5.9 | 95 | X | 7 | 14.2 | x | 0.4 | × | 0.8 | = | 18.73 | (81) |
| Northwest 0.9x | 0.77 | х | 1.9 | 99 | X | , | 14.2 | x | 0.4 | x | 0.8 | = | 6.27 | (81) |
| Northwest 0.9x | 0.77 | х | 0.9 | 9 | X | , | 14.2 | x | 0.4 | × | 0.8 | = | 2.83 | (81) |
| Northwest 0.9x | 0.77 | х | 5.9 | 95 | X | 9 | 9.21 | x | 0.4 | × | 0.8 | | 12.16 | (81) |
| Northwest _{0.9x} | 0.77 | х | 1.9 | 99 | X | 9 | 9.21 | x | 0.4 | × | 0.8 | | 4.07 | (81) |
| Northwest 0.9x | 0.77 | x | 0.9 | 9 | X | | 9.21 | x | 0.4 | × | 0.8 | _ = | 1.84 | (81) |
| _ | | | | | | | | • | | | | | | _ |
| Solar gains in | watts ca | lculated | for eacl | h month | า | | | (83)m | n = Sum(74)m . | (82)m | | | | |
| (83)m= 72.3 | 130.5 | 198.07 | 278.13 | 341.38 | $\overline{}$ | 52.04 | 333.94 | 284 | | 149.4 | | 61.01 |] | (83) |
| Total gains – i | nternal aı | nd solar | (84)m = | - (73)m | + (8 | 83)m | , watts | <u> </u> | | | ! | | 1 | |
| (84)m= 505.97 | 562.09 | 615.93 | 673.81 | 714.5 | 70 | 03.43 | 671.2 | 628 | .01 580.13 | 526.5 | 4 490.73 | 483.15 |] | (84) |
| 7 M | 1.4 | | | | | | | | <u> </u> | | | ı | 1 | |
| / IVIAAN INTAR | nal tempi | aratura <i>l</i> | 'heating | CARCOR | ი) | | | | | | | | | |
| 7. Mean inter | | | ` | | | area f | rom Tah | nle 9 | Th1 (°C) | | | | 21 | (85) |
| Temperature | during h | eating p | eriods ir | n the liv | ing | | | ole 9 | , Th1 (°C) | | | | 21 | (85) |
| Temperature Utilisation fac | during he | eating polins for li | eriods ir | n the liv | ing n (s | ee Ta | ble 9a) | | | 00 | . Nov | Doc | 21 | (85) |
| Temperature Utilisation fac | during he tor for ga | eating po nins for li Mar | eriods ir ving are Apr | n the liv ea, h1,n May | ing n (s | ee Ta Jun | ble 9a) Jul | Α | ug Sep | Oc | | Dec | 21 | |
| Temperature Utilisation fac | during he | eating polins for li | eriods ir | n the liv | ing n (s | ee Ta | ble 9a) | | ug Sep | Oc 0.97 | | Dec 1 | 21 | (85) |
| Temperature Utilisation factorial Jan (86)m= 1 Mean interna | during heater for garage from the following the following temperature of t | eating points for line Mar 0.99 | eriods ir ving are Apr 0.95 iving are | n the liv ea, h1,n May 0.85 ea T1 (f | ing n (s | ee Ta Jun ^{0.65} w ste | ble 9a) Jul 0.48 ps 3 to 7 | 0.5 | ug Sep 53 0.8 able 9c) | 0.97 | 0.99 | 1 | 21 | (86) |
| Temperature Utilisation fac Jan (86)m= 1 | during he ctor for ga Feb | eating points for li Mar 0.99 | eriods ir ving are Apr 0.95 | n the livea, h1,n May | ing n (s | ee Ta Jun ^{0.65} | ble 9a) Jul 0.48 | A 0.5 | ug Sep 53 0.8 able 9c) | | 0.99 | | 21 | |
| Temperature Utilisation factorial Jan (86)m= 1 Mean interna | during hotel durin | eating points for line Mar 0.99 ature in l | eriods in ving are Apr 0.95 iving are 20.68 | n the livea, h1,n May 0.85 ea T1 (f | ing n (s l follo | ee Ta Jun 0.65 w ste | ble 9a) Jul 0.48 ps 3 to 7 21 | 0.57 in T | ug Sep 53 0.8 Table 9c) 1 20.94 | 0.97 | 0.99 | 1 | 21 | (86) |
| Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.07 | during hotel durin | eating points for line Mar 0.99 ature in l | eriods in ving are Apr 0.95 iving are 20.68 | n the livea, h1,n May 0.85 ea T1 (f | ing n (s follo | ee Ta Jun 0.65 w ste | ble 9a) Jul 0.48 ps 3 to 7 21 | 0.57 in T | ug Sep 53 0.8 Table 9c) 1 20.94 9, Th2 (°C) | 0.97 | 0.99 | 1 | 21 | (86) |
| Temperature Utilisation factors Jan (86)m= 1 Mean internation (87)m= 20.07 Temperature (88)m= 20.14 | during heter for garage feb 1 1 1 tempera 20.2 during heter 20.14 | eating points for line Mar 0.99 ature in lage 20.4 eating points 20.15 | eriods ir Apr 0.95 iving are 20.68 eriods ir 20.16 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of | ing (s) (s) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d | ee Ta Jun 0.65 w ste 20.98 velling | Jul 0.48 ps 3 to 7 21 from Ta 20.17 | A 0.57 in T 2 able 9 20. | ug Sep 53 0.8 Table 9c) 1 20.94 9, Th2 (°C) | 20.68 | 0.99 | 20.06 | 21 | (86) |
| Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature | during heter for garage feb 1 1 1 tempera 20.2 during heter 20.14 | eating points for line Mar 0.99 ature in lage 20.4 eating points 20.15 | eriods ir Apr 0.95 iving are 20.68 eriods ir 20.16 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of | ing (something) (s | ee Ta Jun 0.65 w ste 20.98 velling | Jul 0.48 ps 3 to 7 21 from Ta 20.17 | A 0.57 in T 2 able 9 20. | ug Sep 53 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 | 20.68 | 0.99 3 20.33 5 20.16 | 20.06 | 21 | (86) |
| Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 | during heter for gase to for for gase to f | eating points for line Mar 0.99 ature in l 20.4 eating points for r 0.98 | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of do 0.94 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of 20.16 welling, 0.8 | ing (s) | ee Ta Jun 0.65 ow ste 20.98 velling 20.17 om (se 0.58 | Jul 0.48 ps 3 to 7 21 from Ta 20.17 ee Table 0.39 | A 0.57 in T 2 able (20. 9a) 0.4 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 | 0.97 20.68 20.16 | 0.99 3 20.33 5 20.16 | 20.06 | 21 | (86) (87) (88) |
| Temperature Utilisation factors Jan (86)m= 1 Mean internation (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 Mean internation | during heter for gase to for for gase to f | eating points for line of the control of the contro | eriods ir Apr 0.95 iving are 20.68 eriods ir 20.16 est of do 0.94 he rest | m the live a, h1,n May 0.85 ea T1 (for 20.89 morest of 20.16 welling, 0.8 of dwelling | ing (see) (see | ee Ta Jun 0.65 w ste 20.98 velling 20.17 m (se 0.58 | Jul 0.48 ps 3 to 7 21 from Ta 20.17 ee Table 0.39 collow ste | A 0.5.7 in T 2 20. 9a) 0.4.4 pps 3 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 44 0.73 to 7 in Table | 0.97 20.68 20.16 0.95 e 9c) | 0.99 3 20.33 6 20.16 0.99 | 1 20.06 20.15 | | (86) (87) (88) (89) |
| Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 | during heter for gase to for for gase to f | eating points for line Mar 0.99 ature in l 20.4 eating points for r 0.98 | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of do 0.94 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of 20.16 welling, 0.8 | ing (see) (see | ee Ta Jun 0.65 ow ste 20.98 velling 20.17 om (se 0.58 | Jul 0.48 ps 3 to 7 21 from Ta 20.17 ee Table 0.39 | A 0.57 in T 2 able (20. 9a) 0.4 | ug Sep 33 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 4 0.73 4 to 7 in Table 18 20.12 | 0.97 20.68 20.16 0.95 e 9c) 19.79 | 0.99 3 20.33 5 20.16 0.99 19.29 | 1 20.06 20.15 1 18.88 | | (86) (87) (88) (89) |
| Temperature Utilisation factors Jan (86)m= 1 Mean internation (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 Mean internation (90)m= 18.9 | during heter for gase to repeat the second s | eating points for line of the | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of do 0.94 he rest 19.78 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of 20.16 welling, 0.8 of dwel 20.06 | n (s | ee Ta Jun 0.65 w ste 20.98 velling 20.17 m (se 0.58 T2 (fo | Jul 0.48 ps 3 to 7 21 from Ta 20.17 ee Table 0.39 collow stee 20.17 | A 0.5.7 in T 2 able 9 20. 9a) 0.4 eps 3 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 14 0.73 1 to 7 in Table 18 20.12 | 0.97 20.68 20.16 0.95 e 9c) 19.79 | 0.99 3 20.33 6 20.16 0.99 | 1 20.06 20.15 1 18.88 | 21 | (86) (87) (88) (89) |
| Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 Mean interna (90)m= 18.9 Mean interna | during heter for gase to refer for gase to refer gase to r | eating points for line of the | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of dr 0.94 he rest 19.78 | n the live a, h1,n May 0.85 ea T1 (for 20.89 ea T1) for 20.16 welling, 0.8 of dwell 20.06 | follo follo follo follo graph de la companya de | ee Ta Jun 0.65 w ste 20.98 velling 20.17 m (se 0.58 T2 (fo 20.16 | Jul 0.48 ps 3 to 7 21 from Ta 20.17 re Table 0.39 collow ste 20.17 | A 0.5.7 in T 2 20. 20. 20. 4 + (1 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 14 0.73 1 to 7 in Table 18 20.12 | 0.97 20.66 20.16 0.95 e 9c) 19.79 iLA = Li | 0.99 3 20.33 6 20.16 0.99 19.29 ving area ÷ (- | 1 20.06 20.15 1 18.88 4) = | | (86) (87) (88) (89) (90) (91) |
| Temperature Utilisation factors Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 Mean interna (90)m= 18.9 Mean interna (92)m= 19.36 | during heter for gase to refer for gase to refer gase 19.08 I temperate to refer gase 19.08 I temperate 19.08 | eating points for line atture in land 20.4 eating points for rand 20.15 eating for rand 20.15 eature in table atture in table 20.15 eature 20.15 eat | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of do 0.94 he rest 19.78 r the who 20.13 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of 20.16 welling, 0.8 of dwel 20.06 | ing n (s follo follo p h2, h2, c p elling 2 | ee Ta Jun 0.65 w ste 0.98 velling 0.17 m (se 0.58 T2 (fo 0.16 g) = fl 0.48 | Jul 0.48 ps 3 to 7 21 from Ta 20.17 ee Table 0.39 bllow ste 20.17 A × T1 20.49 | A A 0.57 in T 2 20. 9a) 0.4 eps 3 20. + (1 20 | ug Sep 53 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 4 0.73 to 7 in Table 18 20.12 - fLA) × T2 .5 20.44 | 0.97 20.68 20.16 0.95 e 9c) 19.79 LA = Li | 0.99 20.33 20.16 0.99 19.29 ving area ÷ (- | 1 20.06 20.15 1 18.88 | | (86) (87) (88) (89) |
| Temperature Utilisation factors Jan (86)m= 1 Mean internation (87)m= 20.07 Temperature (88)m= 20.14 Utilisation factors (89)m= 1 Mean internation (90)m= 18.9 Mean internation (92)m= 19.36 Apply adjustr | during heter for gase to refer for gase to refer gase to r | eating points for line atture in land 20.4 eating points for rand 20.15 eating points for rand 20.15 eature in table atture (for 19.78 eature mean | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of dr 0.94 he rest 19.78 r the wh 20.13 internal | n the livea, h1,n May 0.85 ea T1 (for 20.89 or rest of 20.16 welling, 0.8 of dwell 20.06 ole dwelling distribution of the dwelling d | ing n (s follo 2 h2, c h12, c follo 2 ratu | ee Ta Jun 0.65 w ste 20.98 velling 20.17 m (se 0.58 T2 (fo 20.16 g) = fl 20.48 ure fro | Jul 0.48 ps 3 to 7 21 from Ta 20.17 re Table 0.39 collow ste 20.17 A × T1 20.49 m Table | A 0.5 of the control | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 14 0.73 1 to 7 in Table 18 20.12 - fLA) × T2 .5 20.44 where approx | 0.97 20.66 20.16 0.95 e 9c) 19.79 iLA = Li ppriate | 0.99 3 20.33 5 20.16 0.99 19.29 ving area ÷ (| 1 20.06 20.15 1 18.88 4) = | | (86) (87) (88) (89) (90) (91) (92) |
| Temperature Utilisation fact Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation fact (89)m= 1 Mean interna (90)m= 18.9 Mean interna (92)m= 19.36 Apply adjustr (93)m= 19.36 | during heter for gase to refer for gase to refer gase to r | eating points for line atture in land 20.4 eating points for rand 20.15 eating for rand 20.15 eature in table atture (for 19.78 eature and 19.78 eating points for rand 20.15 eature in table 20.15 eature (for 19.78 eature and 19 | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of do 0.94 he rest 19.78 r the who 20.13 | n the livea, h1,n May 0.85 ea T1 (f 20.89 n rest of 20.16 welling, 0.8 of dwel 20.06 | ing n (s follo 2 h2, c h12, c follo 2 ratu | ee Ta Jun 0.65 w ste 0.98 velling 0.17 m (se 0.58 T2 (fo 0.16 g) = fl 0.48 | Jul 0.48 ps 3 to 7 21 from Ta 20.17 ee Table 0.39 bllow ste 20.17 A × T1 20.49 | A A 0.57 in T 2 20. 9a) 0.4 eps 3 20. + (1 20 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 14 0.73 1 to 7 in Table 18 20.12 - fLA) × T2 5 20.44 where approximation of the second of the sec | 0.97 20.68 20.16 0.95 e 9c) 19.79 LA = Li | 0.99 3 20.33 5 20.16 0.99 19.29 ving area ÷ (| 1 20.06 20.15 1 18.88 4) = | | (86) (87) (88) (89) (90) (91) |
| Temperature Utilisation fact Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation fact (89)m= 1 Mean interna (90)m= 18.9 Mean interna (92)m= 19.36 Apply adjustr (93)m= 19.36 8. Space hear | during heter for gase stor for | eating policins for line atture in land 20.4 eating policins for range 20.15 eature in table atture in table atture (for 19.78 eature mean 19.78 eature in table atture in table atture in table atture in table atture (for 19.78 eature mean 19.78 eature in table atture in table atture (for 19.78 eature mean 19.78 eature in table atture in table atture in table atture in table atture (for 19.78 eature in table atture in table att | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of dr 0.94 he rest 19.78 r the wh 20.13 internal 20.13 | n the livea, h1,n May 0.85 ea T1 (for 20.89 in rest of 20.16 welling, 0.8 of dwell 20.06 in live 20.38 in tempe 20.38 | ing n (s follo 2 h2, h2, c lling 2 ratu 2 | ee Ta Jun 0.65 w ste 20.98 velling 20.17 m (se 0.58 T2 (fo 20.16 g) = fl 20.48 ure fro 20.48 | ble 9a) Jul 0.48 ps 3 to 7 21 from Ta 20.17 re Table 0.39 bllow ste 20.17 A × T1 20.49 m Table 20.49 | A 0.5 in T 2 able (20. 9a) 0.4 eps 3 20. + (1 20 4 4e, 20 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 14 0.73 1 to 7 in Table 18 20.12 - fLA) × T2 5 20.44 where appre 5 20.44 | 0.97 20.66 20.16 0.95 e 9c) 19.79 20.13 ppriate 20.13 | 0.99 3 20.33 5 20.16 0.99 19.29 ving area ÷ (4) 3 19.69 | 1 20.06 20.15 1 1 18.88 4) = 19.34 | 0.39 | (86) (87) (88) (89) (90) (91) (92) |
| Temperature Utilisation fact Jan (86)m= 1 Mean interna (87)m= 20.07 Temperature (88)m= 20.14 Utilisation fact (89)m= 1 Mean interna (90)m= 18.9 Mean interna (92)m= 19.36 Apply adjustr (93)m= 19.36 | during heter for gase stor for | eating policins for line atture in land 20.4 eating policins for random 19.38 eature in tangent 19.38 eature (for 19.78 eature emean 19.78 eature in tangent ernal ten | eriods in ving are Apr 0.95 iving are 20.68 eriods in 20.16 est of do 0.94 he rest 19.78 r the who 20.13 internal 20.13 | n the live ea, h1,n May 0.85 ea T1 (for 20.89 in rest of 20.16 in welling, 0.8 of dwell 20.06 in live ear 20.38 in temper 20.38 in rest of dwell 20.38 in temper 20.38 in rest of dwell 20.38 in temper 20.38 in rest of dwell 20.38 in temper | ing n (s follo 2 h2, h2, c lling 2 ratu 2 | ee Ta Jun 0.65 w ste 20.98 velling 20.17 m (se 0.58 T2 (fo 20.16 g) = fl 20.48 ure fro 20.48 | ble 9a) Jul 0.48 ps 3 to 7 21 from Ta 20.17 re Table 0.39 bllow ste 20.17 A × T1 20.49 m Table 20.49 | A 0.5 in T 2 able (20. 9a) 0.4 eps 3 20. + (1 20 4 4e, 20 | ug Sep 63 0.8 Table 9c) 1 20.94 9, Th2 (°C) 18 20.17 14 0.73 1 to 7 in Table 18 20.12 - fLA) × T2 5 20.44 where appre 5 20.44 | 0.97 20.66 20.16 0.95 e 9c) 19.79 20.13 ppriate 20.13 | 0.99 3 20.33 5 20.16 0.99 19.29 ving area ÷ (4) 3 19.69 | 1 20.06 20.15 1 1 18.88 4) = 19.34 | 0.39 | (86) (87) (88) (89) (90) (91) (92) |

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Mar

Jan

Feb

| There is a first transfer of the state of th | | | | | | |
|--|--|--|---------------------------------------|----------------------|---|---|
| Utilisation factor for gains, hm: (94)m= | 0.49 0.76 | 0.05 | 0.00 | | | (94) |
| (94)m= 1 0.99 0.98 0.94 0.82 0.6 0.43 0 Useful gains, hmGm , W = (94)m x (84)m | 0.48 0.76 | 0.95 | 0.99 | 1 | | (94) |
| | 299.34 439.41 | 502.4 | 486.42 | 481.66 | | (95) |
| Monthly average external temperature from Table 8 | | | | | | |
| (96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 1 | 16.4 14.1 | 10.6 | 7.1 | 4.2 | | (96) |
| Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(| · | r – | | 1 | | |
| | 300.97 471.17 | 715.57 | 951.79 | 1151.87 | | (97) |
| Space heating requirement for each month, kWh/month = 0.024 x (98)m= 488.99 380.25 307.85 154.8 50.62 0 0 | $\frac{x[(97)m - (95)}{0}$ |)m] x (4 158.6 | 1)m 335.07 | 498.64 | | |
| (00)1112 400.33 300.23 307.03 134.0 30.02 0 0 | Total per year | <u> </u> | | Ь—— | 2374.82 | (98) |
| Space heating requirement in kWh/m²/year | | () | , (- | | 28.72 | (99) |
| 9b. Energy requirements – Community heating scheme | | | | Ĺ | 20.12 | (00) |
| This part is used for space heating, space cooling or water heating | a provided by | a comm | unity sch | neme. | | |
| Fraction of space heat from secondary/supplementary heating (Ta | | | u, co. | | 0 | (301) |
| Fraction of space heat from community system $1 - (301) =$ | | | | | 1 | (302) |
| The community scheme may obtain heat from several sources. The procedure allo includes boilers, heat pumps, geothermal and waste heat from power stations. See | | up to four | other heat | sources; th | ne latter | <u> </u> |
| Fraction of heat from Community heat pump | | | | إ | 1 | (303a) |
| Fraction of total space heat from Community heat pump | | (3 | 02) x (303 | a) = | 1 | (304a) |
| Factor for control and charging method (Table 4c(3)) for communit | ity heating sys | tem | | | 1 | (305) |
| | | | | L | | |
| Distribution loss factor (Table 12c) for community heating system | | | | [| 1.05 | (306) |
| Distribution loss factor (Table 12c) for community heating system Space heating | | | | [| 1.05 kWh/ye | (306) |
| · , , , , , , , , , , , , , , , , , , , | | | | [] | | (306) |
| Space heating | (98) x (3 | 04a) x (30 | 5) x (306) : | [- [| kWh/ye | (306) |
| Space heating Annual space heating requirement | | , , | , , , | [= [| kWh/ye 2374.82 | (306) ar |
| Space heating Annual space heating requirement Space heat from Community heat pump | Table 4a or A | , , | E) | - | kWh/ye 2374.82 2493.56 | (306) ar (307a) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system) | Table 4a or A | ppendix | E) | - | kWh/ye 2374.82 2493.56 | (306) ar (307a) (308 |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from | Table 4a or A | ppendix | E) | - [[[| kWh/ye 2374.82 2493.56 | (306) ar (307a) (308 |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating | Table 4a or <i>A</i> | ppendix 01) x 100 | E) |]]] | 2374.82 2493.56 0 | (306) ar (307a) (308 |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: | Table 4a or <i>A</i> | on ppendix 01) x 100 | E) : (308) = :5) x (306) = | [[= | 2374.82 2493.56 0 0 2127.66 | (306) ar (307a) (308 (309) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump | Table 4a or Am (98) x (3 | on ppendix 01) x 100 | E) : (308) = :5) x (306) = | [[= | kWh/ye 2374.82 2493.56 0 0 2127.66 | (306) ar (307a) (308 (309) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution | Table 4a or Am (98) x (3 | on ppendix on x 100 and a | E) : (308) = :5) x (306) = | [[= | kWh/ye 2374.82 2493.56 0 0 2127.66 2234.04 47.28 | (306) ar (307a) (308 (309) (310a) (313) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio | (64) x (3 0.01 x [(307a) | on ppendix on x 100 and a | E) : (308) = :5) x (306) = | [[= | 2374.82 2493.56 0 0 2127.66 2234.04 47.28 | (306) ar (307a) (308 (309) (310a) (313) (314) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): | (64) x (3 0.01 x [(307a) | on ppendix on x 100 and a | E) : (308) = :5) x (306) = | [[= | 2374.82 2493.56 0 0 2127.66 2234.04 47.28 0 | (306) ar (307a) (308 (309) (310a) (313) (314) (315) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our warm air heating system fans | (64) x (3 0.01 x [(307a) | on ppendix on x 100 and a | E) : (308) = :5) x (306) = | [[= | 2374.82 2493.56 0 0 2127.66 2234.04 47.28 0 0 | (306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a) (330b) |
| Space heating Annual space heating requirement Space heat from Community heat pump Efficiency of secondary/supplementary heating system in % (from Space heating requirement from secondary/supplementary system Water heating Annual water heating requirement If DHW from community scheme: Water heat from Community heat pump Electricity used for heat distribution Cooling System Energy Efficiency Ratio Space cooling (if there is a fixed cooling system, if not enter 0) Electricity for pumps and fans within dwelling (Table 4f): mechanical ventilation - balanced, extract or positive input from our | (64) x (3 0.01 x [(307a) = (107) - | on ppendix on x 100 and a | E) ÷ (308) = 5) x (306) = · (310a)(| [[= | 2374.82 2493.56 0 0 2127.66 2234.04 47.28 0 | (306) ar (307a) (308 (309) (310a) (313) (314) (315) (330a) |

(332)Energy for lighting (calculated in Appendix L) 355.57 Total delivered energy for all uses (307) + (309) + (310) + (312) + (315) + (331) + (332)...(237b) =5312.49 (338)12b. CO2 Emissions – Community heating scheme **Emission factor Emissions** Energy kWh/year kg CO2/kWh kg CO2/year CO2 from other sources of space and water heating (not CHP) If there is CHP using two fuels repeat (363) to (366) for the second fuel Efficiency of heat source 1 (%) (367a) 383 CO2 associated with heat source 1 $[(307b)+(310b)] \times 100 \div (367b) \times$ (367)640.63 0.52 Electrical energy for heat distribution [(313) x (372)0.52 24.54 Total CO2 associated with community systems (363)...(366) + (368)...(372)(373)665.17 CO2 associated with space heating (secondary) (309) x (374)0 0 CO2 associated with water from immersion heater or instantaneous heater (312) x 0.22 (375)0 Total CO2 associated with space and water heating (373) + (374) + (375) =(376)665.17 CO2 associated with electricity for pumps and fans within dwelling (331)) x (378)0.52 119.02 CO2 associated with electricity for lighting (332))) x 0.52 (379)184.54 sum of (376)...(382) =Total CO2, kg/year (383)968.73 **Dwelling CO2 Emission Rate** $(383) \div (4) =$ (384)11.71

El rating (section 14)

(385)

89.83

| | | User Details: | | | |
|---------------------------------|--|--|--|--------------|------------|
| Assessor Name: | Ben Talbutt | Stroma Number | | 036639 | |
| Software Name: | Stroma FSAP 2012 | Software Version | on: Version | n: 1.0.5.17 | |
| | Р | roperty Address: D1-01 | | | |
| Address : | to | | | | |
| Overall dwelling dimer | nsions: | A a (2) | . Haimbalan | V = 1, = / 2 | \ \ |
| Ground floor | | Area(m²) Av | 7. Height(m) 2.82 (2a) = [| Volume(m³ | (3a) |
| First floor | | 40.31 (1b) x | 3.15 (2b) = | 126.98 | (3b) |
| |)+(1b)+(1c)+(1d)+(1e)+(1r | | 3.15 | 120.96 | (35) |
| |)+(10)+(16)+(10)+(1 6)+(11 | | o) (2d) (2o) (2o) - [| | ¬ |
| Dwelling volume | | (3a)+(3b)+(3t | c)+(3d)+(3e)+(3n) = | 246.52 | (5) |
| 2. Ventilation rate: | main secondar | y other to | otal | m³ per hou | r |
| Number of chimneys | heating heating | , | 40 | | (6a) |
| Number of open flues | | | | 0 | = ' ' |
| Number of intermittent fan | |] + [0 = [| | 0 | (6b) |
| | 15 | | <u> </u> | 30 | (7a) |
| Number of passive vents | | | | 0 | (7b) |
| Number of flueless gas fir | es | | 0 x 40 = | 0 | (7c) |
| | | | Air ch | anges per ho | our |
| Infiltration due to chimney | s, flues and fans = $(6a)+(6b)+(7a)$ | (a)+(7b)+(7c) = | 30 ÷ (5) = | 0.12 | (8) |
| If a pressurisation test has be | en carried out or is intended, procee | d to (17), otherwise continue from (| l L | - | `` |
| Number of storeys in the | e dwelling (ns) | | | 0 | (9) |
| Additional infiltration | 25 for atool or timber frame or | 0.25 for maconing constructi | $[(9)-1]x0.1 = \begin{bmatrix} \\ \end{bmatrix}$ | 0 | (10) |
| | 25 for steel or timber frame or esent, use the value corresponding to | • | ion [| 0 | (11) |
| deducting areas of opening | gs); if equal user 0.35 | | - | | _ |
| • | oor, enter 0.2 (unsealed) or 0 | 1 (sealed), else enter 0 | | 0 | (12) |
| If no draught lobby, ente | • | | | 0 | (13) |
| · · | and doors draught stripped | 0.25 - [0.2 x (14) ÷ 100] | _ | 0 | (14) |
| Window infiltration | | (8) + (10) + (11) + (12) + (13) + (14) + (15) + (| L | 0 | (15) |
| Infiltration rate | | | <u> </u> | 0 | (16) |
| • | q50, expressed in cubic metre | | e or envelope area | 5 | (17) |
| | ty value, then $(18) = [(17) \div 20] + (18)$ | | | 0.37 | (18) |
| Number of sides sheltered | if a pressurisation test has been dor | ie or a degree air permeability is be | eirig usea [| | (19) |
| Shelter factor | A | (20) = 1 - [0.075 x (19)] = | = | 0.85 | (20) |
| Infiltration rate incorporation | ng shelter factor | $(21) = (18) \times (20) =$ | L T | 0.32 | (21) |
| Infiltration rate modified fo | | | L | 0.02 | ` ′ |
| | Mar Apr May Jun | Jul Aug Sep (| Oct Nov Dec | | |
| Monthly average wind spe | eed from Table 7 | | | | |

4.3

3.8

3.8

3.7

4.3

4.5

4.7

| Wind Factor (2 (22a)m= 1.27 | 22a)m = | (22)m ÷ | 1.1 | 1.08 | 0.95 | 0.95 | 0.92 | 1 1 | 1.08 | 1.12 | 1.18 | 1 | |
|--|--|---|--------------------|------------------|---|---|---|--|---|---------------------|--------------------|--------|---|
| (224)111- 1.21 | 1.20 | 1.20 | 1 | 1.00 | 0.55 | 0.55 | 0.52 | <u> </u> | 1.00 | 1.12 | 1.10 | l | |
| Adjusted infiltra | | <u> </u> | | | | ` | r` ´ | ì ´ | | | | 1 | |
| 0.4 Calculate effec | 0.39 Ctive air | 0.39 change | 0.35 rate for t | 0.34 he appli | 0.3 Cable ca | 0.3 | 0.29 | 0.32 | 0.34 | 0.36 | 0.37 | | |
| If mechanica | | _ | | upp | | | | | | | | 0 | (23a) |
| If exhaust air he | eat pump ı | using Appe | endix N, (2 | 3b) = (23a | ı) × Fmv (e | equation (I | N5)) , othe | rwise (23b |) = (23a) | | | 0 | (23b) |
| If balanced with | heat reco | overy: effic | iency in % | allowing f | or in-use f | actor (fron | n Table 4h |) = | | | | 0 | (23c) |
| a) If balance | d mech | anical ve | ntilation | with hea | at recove | ery (MVI | 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 balance | ed mecha | anical ve | entilation | without | heat rec | covery (N | ИV) (24b | m = (22) | 2b)m + (| 23b) | ī | 1 | |
| (24b)m= 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (24b) |
| c) If whole h | | | | • | | | | | F (00) | | | | |
| if (22b)n (24c)m= 0 | n < 0.5 × | (23b), t | nen (240 | c) = (230) | o); otner\ | wise (24 | c) = (221) | o) m + 0. | $\frac{.5 \times (230)}{0}$ |) ₀ | l 0 | 1 | (24c) |
| (1) | | | | | | | | | | | 0 | | (240) |
| d) If natural if (22b)n | | | | | • | | | | 0.5] | | | | |
| (24d)m= 0.58 | 0.58 | 0.57 | 0.56 | 0.56 | 0.55 | 0.55 | 0.54 | 0.55 | 0.56 | 0.56 | 0.57 | | (24d) |
| Effective air | change | rate - er | nter (24a | or (24b | o) or (24 | c) or (24 | d) in bo | x (25) | | ! | ! | • | |
| (25)m= 0.58 | 0.58 | 0.57 | 0.56 | 0.56 | 0.55 | 0.55 | 0.54 | 0.55 | 0.56 | 0.56 | 0.57 | | (25) |
| 3. Heat losse | s and he | eat loss r | paramete | er: | | | | | | | | | |
| | | | | | | | | | | | | | |
| ELEMENT | Gros area | | Openin m | - | Net Ar A ,r | | U-val W/m2 | | A X U (W/ | | k-value kJ/m²-l | | A X k kJ/K |
| Doors | | | | - | | m² | | | | | | | |
| | area | | | - | A ,r | m ² x | W/m2 | 2K = [| (W/ | | | | kJ/K |
| Doors | area | | | - | A ,r | m² x x1 | W/m2 | eK = [0.04] = [| (W/ 2.52 | | | | kJ/K (26) |
| Doors Windows Type | area e 1 e 2 | | | - | A ,r 2.52 | m² x x1 x1 | W/m2 1 /[1/(1.4)+ | = [0.04] = [0.04] = [| 2.52 0.95 | | | | kJ/K (26) (27) |
| Doors Windows Type Windows Type | area | | | - | A ,r 2.52 0.72 | m ² x x ¹ x ¹ x ¹ | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ | $ \begin{array}{ccc} & & & \\ & & & &$ | 2.52 0.95 2.13 | | | | kJ/K (26) (27) (27) |
| Doors Windows Type Windows Type Windows Type | area | | | - | A ,r 2.52 0.72 1.61 2.01 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | K = 0.04 = 0.0 | 2.52 0.95 2.13 2.66 | | | | kJ/K (26) (27) (27) (27) |
| Doors Windows Type Windows Type Windows Type Windows Type | area | | | - | A ,r 2.52 0.72 1.61 2.01 0.91 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | K = C | 2.52 0.95 2.13 2.66 1.21 | | | | kJ/K (26) (27) (27) (27) (27) |
| Doors Windows Type Windows Type Windows Type Windows Type Windows Type | area | | | - | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | K = C | (W// 2.52 0.95 2.13 2.66 1.21 7.89 | | | | kJ/K (26) (27) (27) (27) (27) (27) |
| Doors Windows Type Windows Type Windows Type Windows Type Windows Type Windows Type | area 2 2 3 4 4 5 5 6 6 7 | | | - | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | K | (W/ 2.52 0.95 2.13 2.66 1.21 7.89 2.64 | | | | kJ/K (26) (27) (27) (27) (27) (27) (27) |
| Doors Windows Type | area 2 2 3 4 4 5 5 6 6 7 | | | - | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ | K | 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 | k) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) |
| Doors Windows Type | area 2 2 3 4 4 5 5 6 6 7 | (m²) | | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 | m ² | W/m2 1 /[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 | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 | k) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Doors Windows Type Floor | area area area area area area area area | (m²) | m | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 | m ² | W/m2 1 /[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 | 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 | k) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Doors Windows Type | area 1 2 3 4 4 5 6 6 7 8 8 | 6 99 | 17.5 | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.13 0.18 | K | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 | k) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Doors Windows Type | area 1 2 3 4 4 5 6 6 7 8 8 | 6 99 | 17.5 | <u>,</u> | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.13 0.18 | K | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 | k) | | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Doors Windows Type Tloor Walls Type1 Walls Type2 Total area of e | area 2 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 95.6 12.9 | 6 99 s, m² | 17.5 | 1 ndow U-ve | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 12.99 150.9 56.48 alue calcul | m ² | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.13 0.18 0.18 | K | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 14.06 2.34 | k) | kJ/m²-l | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (27 |
| Doors Windows Type Tloor Walls Type1 Walls Type2 Total area of e Party wall * for windows and | area area | 6 99 ows, use e sides of in | 17.5 0 | 1 ndow U-ve | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 12.99 150.9 56.48 alue calcul | x1 x | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.13 0.18 0.18 | K | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 14.06 2.34 | k) | kJ/m²-l | | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (28) (29) (29) (31) (32) |
| Doors Windows Type Tloor Walls Type1 Walls Type2 Total area of e Party wall * for windows and ** include the area | area area area area area area area area | 6 99 ows, use e sides of in = S (A x | 17.5 0 | 1 ndow U-ve | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 12.99 150.9 56.48 alue calcul | x1 x | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.13 0.18 0.18 | K = 0.04 = | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 14.06 2.34 | k) | kJ/m²·l | X | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (28) (29) (31) (32) |
| Doors Windows Type Tloor Walls Type1 Walls Type2 Total area of e Party wall * for windows and ** include the area Fabric heat los | area area | 6 pg ows, use e sides of in = S (A x (A x k) | 17.5 0 | 1 ndow U-va | A ,r 2.52 0.72 1.61 2.01 0.91 5.95 1.99 0.9 42.39 78.09 150.9 56.48 alue calculatitions | x1 x | W/m2 1 /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ /[1/(1.4)+ 0.13 0.18 0.18 | $ \begin{array}{cccc} & & & & & & & \\ & & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & \\$ | (W// 2.52 0.95 2.13 2.66 1.21 7.89 2.64 1.19 1.19 5.5107 14.06 2.34 | K) | kJ/m²·l | 13.2 | kJ/K (26) (27) (27) (27) (27) (27) (27) (27) (28) (29) (31) (32) |

| can be u | sed instea | ad of a de | tailed calci | ulation. | | | | | | | | | | |
|------------|------------------|----------------------|-----------------------|-------------|----------------------------|-------------|-------------------|-------------|------------|---------------------------|------------------------|---------|---------|------|
| Therma | al bridge | es : S (L | x Y) cal | culated | using Ap | pendix I | K | | | | | | 9.09 | (36) |
| | • | , | , | | = 0.05 x (3 | • | | | | | | | | ` ′ |
| Total fa | abric hea | at loss | | | | | | | (33) + | (36) = | | | 53.39 | (37) |
| Ventila | tion hea | t loss ca | alculated | monthly | у | | | | (38)m | = 0.33 × (| 25)m x (5) |) | _ | |
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | | |
| (38)m= | 47.28 | 47.02 | 46.77 | 45.59 | 45.37 | 44.34 | 44.34 | 44.15 | 44.74 | 45.37 | 45.81 | 46.28 | | (38) |
| Heat tr | ansfer c | oefficier | nt, W/K | | | | | | (39)m | = (37) + (37) | 38)m | | _ | |
| (39)m= | 100.66 | 100.4 | 100.15 | 98.97 | 98.75 | 97.72 | 97.72 | 97.53 | 98.12 | 98.75 | 99.2 | 99.67 | | |
| Heat lo | ss para | meter (H | HLP), W/ | m²K | | | | | | Average = = (39)m ÷ | | 12 /12= | 98.97 | (39) |
| (40)m= | 1.22 | 1.21 | 1.21 | 1.2 | 1.19 | 1.18 | 1.18 | 1.18 | 1.19 | 1.19 | 1.2 | 1.21 | | |
| Numbe | er of day | s in mor | nth (Tab | le 1a) | | | | | ı | Average = | Sum(40) ₁ | 12 /12= | 1.2 | (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: | |
| Λ | | | \ 1 | | | | | | | | | | 1 | |
| if TF. | | | | [1 - exp | (-0.0003 | 349 x (TF | FA -13.9 |)2)] + 0.0 | 0013 x (| TFA -13. | | .51 | J | (42) |
| | | , | ater usaç | ge in litre | es per da | ay Vd,av | erage = | (25 x N) | + 36 | | 93 | 3.86 | 1 | (43) |
| | | _ | | | 5% if the d ater use, l | _ | _ | to achieve | a water us | se target o | f | | J | |
| not more | 1 | | | | <u> </u> | | | Ε. | | . . | l | I _ | 1 | |
| Hot water | Jan Tusaga ir | Feb | Mar day for ea | Apr | May Vd,m = fa | Jun | Jul Table 1c v | Aug | Sep | Oct | Nov | Dec | | |
| ı | i | • | | 1 | | | | | 04.00 | 05.74 | 00.40 | 402.05 | 1 | |
| (44)m= | 103.25 | 99.49 | 95.74 | 91.99 | 88.23 | 84.48 | 84.48 | 88.23 | 91.99 | 95.74 | 99.49 | 103.25 | 1106.05 | (44) |
| Energy o | content of | hot water | used - cal | culated m | onthly $= 4$. | 190 x Vd,r | m x nm x L | OTm / 3600 | | Total = Su oth (see Ta | | | 1126.35 | (44) |
| (45)m= | 153.11 | 133.92 | 138.19 | 120.48 | 115.6 | 99.75 | 92.44 | 106.07 | 107.34 | 125.09 | 136.55 | 148.28 |] | |
| | | | | | ! | ! | | | | Total = Su | m(45) ₁₁₂ : | - | 1476.82 | (45) |
| If instant | aneous w | ater heatii | ng at point | of use (no | hot water | r storage), | enter 0 in | boxes (46 |) to (61) | | | | _ | |
| (46)m= | 22.97 | 20.09 | 20.73 | 18.07 | 17.34 | 14.96 | 13.87 | 15.91 | 16.1 | 18.76 | 20.48 | 22.24 | | (46) |
| | storage | | includin | va anv c | olar or M | WHDC | ctorogo | within sa | mo voc | col | | 150 | 1 | (47) |
| • | | , | | • | /elling, e | | • | | illic ves | 3 C I | | 150 | | (47) |
| | • | - | | | _ | | | mbi boil | ers) ente | er '0' in <i>(</i> | 47) | | | |
| | storage | | | . (| | | | | o. o, o | | , | | | |
| a) If m | anufact | urer's de | eclared l | oss facto | or is kno | wn (kWł | n/day): | | | | 1 | .39 | | (48) |
| Tempe | rature fa | actor fro | m Table | 2b | | | | | | | 0 | .54 | | (49) |
| | | | storage | - | | | | (48) x (49) | = | | 0 | .75 |] | (50) |
| • | | | | - | loss fact | | | | | | | | - 1 | |
| | | _ | factor fr ee secti | | le 2 (kW | n/litre/da | ay) | | | | | 0 |] | (51) |
| | • | eating s from Tal | | UII 4.3 | | | | | | | | 0 | 1 | (52) |
| | | | m Table | 2b | | | | | | | | 0 | 1 | (53) |
| • | | | | | | | | | | | | | 4 | |

| Energy lost from water storage, kWh | /year | (4 | 47) x (51) | x (52) x (5 | 53) = | | 0 | | (54) |
|--|--|--|--|--|---|--|--|---------------|--------------------------------------|
| Enter (50) or (54) in (55) | | | | | | 0. | 75 | | (55) |
| Water storage loss calculated for ea | ch month | ((5 | (56)m = $(5$ | 55) × (41)n | n | | | | |
| (56)m= 23.33 21.07 23.33 22.5 | 3 23.33 22.58 | 23.33 | 23.33 | 22.58 | 23.33 | 22.58 | 23.33 | | (56) |
| If cylinder contains dedicated solar storage, (| (57)m = (56) m x $[(50)$ – | (H11)] ÷ (50), | , else (57 | r)m = (56)r | n where (| H11) is fro | m Append | ix H | |
| (57)m= 23.33 21.07 23.33 22.5 | 3 23.33 22.58 | 23.33 | 23.33 | 22.58 | 23.33 | 22.58 | 23.33 | | (57) |
| Primary circuit loss (annual) from Ta | ble 3 | | | | | | 0 | | (58) |
| Primary circuit loss calculated for ea | ch month (59)m = | (58) ÷ 365 | 5 × (41)ı | m | | | | | |
| (modified by factor from Table H5 | if there is solar wa | ter heating | g and a | cylinder | thermo | stat) | 1 | | |
| (59)m= 23.26 21.01 23.26 22.5 | 1 23.26 22.51 | 23.26 | 23.26 | 22.51 | 23.26 | 22.51 | 23.26 | | (59) |
| Combi loss calculated for each month | h (61)m = (60) ÷ 3 | 65 × (41)m | n | | | | | | |
| (61)m= 0 0 0 0 | 0 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (61) |
| Total heat required for water heating | calculated for each | ch month (6 | 62)m = | 0.85 × (| 45)m + | (46)m + | (57)m + | (59)m + (61)m | |
| (62)m= 199.71 176 184.78 165.5 | 7 162.19 144.85 | 139.03 | 152.67 | 152.43 | 171.69 | 181.64 | 194.88 | | (62) |
| Solar DHW input calculated using Appendix (| or Appendix H (negat | ive quantity) (| (enter '0' | if no solar | contributi | on to wate | er heating) | | |
| (add additional lines if FGHRS and/o | r WWHRS applies | s, see Appe | endix G | 3) | | | | | |
| (63)m= 0 0 0 0 | 0 0 | 0 | 0 | 0 | 0 | 0 | 0 | | (63) |
| Output from water heater | | | • | | | | | | |
| (64)m= 199.71 176 184.78 165.5 | 7 162.19 144.85 | 139.03 | 152.67 | 152.43 | 171.69 | 181.64 | 194.88 | | |
| | • | | Outp | ut from wa | iter heater | · (annual)₁ | 12 | 2025.44 | (64) |
| | | | | | | | | | |
| Heat gains from water heating, kWh. | month 0.25 ' [0.85 | 5 × (45)m + | + (61)m |] + 0.8 x | [(46)m | + (57)m | + (59)m |] | |
| Heat gains from water heating, kWh. (65)m= 88.19 78.2 83.22 76.1 | | - ` | + (61)m 72.54 | 71.76 | 78.87 | + (57)m 81.48 | + (59)m 86.58 |] | (65) |
| | 3 75.71 69.24 | 68.01 | 72.54 | 71.76 | 78.87 | 81.48 | 86.58 | | (65) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 | 75.71 69.24 m only if cylinder | 68.01 | 72.54 | 71.76 | 78.87 | 81.48 | 86.58 | | (65) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and | 75.71 69.24 m only if cylinder | 68.01 | 72.54 | 71.76 | 78.87 | 81.48 | 86.58 | | (65) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts | 75.71 69.24 om only if cylinder i 5a): | 68.01 | 72.54 welling o | 71.76 or hot wa | 78.87 | 81.48 | 86.58 | | (65) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts | 75.71 69.24 mm only if cylinder in 5a): | 68.01 sis in the dw | 72.54 | 71.76 | 78.87 ater is fr | 81.48 om com | 86.58 munity h | | (65) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 | 75.71 69.24 mm only if cylinder in 5a): T May Jun 6 125.6 125.6 | 68.01 dis in the dw | 72.54 welling of | 71.76 or hot was Sep 125.6 | 78.87 ater is fr | 81.48 om com | 86.58 munity h | | |
| include (57)m in calculation of (65) 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 12 | 75.71 69.24 mm only if cylinder in 5a): T May Jun 6 125.6 125.6 ix L, equation L9 of | 68.01 dis in the dw Jul 125.6 dr L9a), also | Aug 125.6 so see T | 71.76 or hot was Sep 125.6 Table 5 | 78.87 ater is fr Oct 125.6 | 81.48 om com | 86.58 munity h | | |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendence of the company of th | 75.71 69.24 mm only if cylinder in the second of the secon | Jul 125.6 or L9a), also 7.63 | 72.54 welling of Aug 125.6 so see T 9.92 | 71.76 or hot was Sep 125.6 Table 5 13.31 | 78.87 ater is fr Oct 125.6 | 81.48 om com Nov 125.6 | 86.58 munity h | | (66) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65) 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication of Calculated in Appendication (Calculated in Appendication of Calculated in | 75.71 69.24 mm only if cylinder in the cylinde | Jul 125.6 125.6 125.6 13 or L13a | Aug 125.6 so see T 9.92 a), also | 71.76 or hot was Sep 125.6 Table 5 13.31 see Tab | 78.87 ater is fr Oct 125.6 16.9 ble 5 | 81.48 om com Nov 125.6 | 86.58 munity h | | (66) (67) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Application Appendix (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendix (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendix (68)m= 224.99 227.33 221.44 208.9 | 75.71 69.24 mm only if cylinder in only in | Jul 125.6 125.6 13 or L13a 168.32 | Aug 125.6 so see T 9.92 a), also | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 171.87 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 | 81.48 om com Nov 125.6 | 86.58 munity h | | (66) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication (68)m= 224.99 227.33 221.44 208.9 Cooking gains (calculated in Appendication (58)m= 224.99 227.33 221.44 208.9 | 75.71 69.24 mm only if cylinder in only in only if cylinder in only in onl | Jul 125.6 or L9a), also 7.63 13 or L13a 168.32 or L15a), | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 171.87 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 | 81.48 om com Nov 125.6 19.73 | 86.58 munity h | | (66) (67) (68) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125. Lighting gains (calculated in Appendication of the companience) 18.18 14.78 11.1 Appliances gains (calculated in Appendication of the companience) 127.33 121.44 1208.9 Cooking gains (calculated in Appendication of the companience) 125.6 125.6 125.6 125.6 18.18 14.78 11.1 14.78 11.1 14.78 11.1 18.18 14.78 15.7 15.7 15.7 15.7 15.7 18.18 14.78 11.1 15.7 | 75.71 69.24 mm only if cylinder in only in only if cylinder in only in onl | Jul 125.6 or L9a), also 7.63 13 or L13a 168.32 or L15a), | Aug 125.6 so see T 9.92 a), also | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 171.87 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 | 81.48 om com Nov 125.6 | 86.58 munity h | | (66) (67) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125. Lighting gains (calculated in Appendication (Ca | 75.71 69.24 mm only if cylinder in only if cylinder in 5a): T May Jun 6 125.6 125.6 ix L, equation L9 on the color L9 on the cylinder L9 on the cylinder in L9 on the cylinder L9 on th | Jul 125.6 125.6 13 or L13a 168.32 or L15a), 3 | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Tab 171.87 ee Table 35.56 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 5 35.56 | 81.48 om com Nov 125.6 19.73 | 86.58 munity h Dec 125.6 21.03 215.06 | | (66) (67) (68) (69) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication (68)m= 224.99 227.33 221.44 208.5 Cooking gains (calculated in Appendication (69)m= 35.56 35.56 35.56 35.5 Pumps and fans gains (Table 5a) (70)m= 3 3 3 3 | 75.71 69.24 mm only if cylinder in only in | Jul 125.6 or L9a), also 7.63 13 or L13a 168.32 or L15a), | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 171.87 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 | 81.48 om com Nov 125.6 19.73 | 86.58 munity h | | (66) (67) (68) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication) (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication) (68)m= 224.99 227.33 221.44 208.9 Cooking gains (calculated in Appendication) (69)m= 35.56 35.56 35.56 35.56 Pumps and fans gains (Table 5a) (70)m= 3 3 3 3 Losses e.g. evaporation (negative value) 40 | 75.71 69.24 mm only if cylinder in only if cylinder in 5a): T May Jun 6 125.6 125.6 ix L, equation L9 condix L, equation L 2 193.11 178.25 ix L, equation L15 6 35.56 35.56 35.56 | Jul 125.6 13 or L13a 168.32 or L15a), 3 | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 171.87 ee Table 35.56 | 78.87 Atter is from Oct 125.6 16.9 ble 5 184.39 5 35.56 | 81.48 om com Nov 125.6 19.73 200.2 | 86.58 munity h Dec 125.6 21.03 215.06 35.56 | | (66) (67) (68) (69) (70) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication (68)m= 224.99 227.33 221.44 208.5 Cooking gains (calculated in Appendication (69)m= 35.56 35.56 35.56 35.5 Pumps and fans gains (Table 5a) (70)m= 3 3 3 3 | 75.71 69.24 mm only if cylinder in only if cylinder in 5a): T May Jun 6 125.6 125.6 ix L, equation L9 condix L, equation L 2 193.11 178.25 ix L, equation L15 6 35.56 35.56 35.56 | Jul 125.6 13 or L13a 168.32 or L15a), 3 | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Tab 171.87 ee Table 35.56 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 5 35.56 | 81.48 om com Nov 125.6 19.73 | 86.58 munity h Dec 125.6 21.03 215.06 | | (66) (67) (68) (69) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication) (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication) (68)m= 224.99 227.33 221.44 208.9 Cooking gains (calculated in Appendication) (69)m= 35.56 35.56 35.56 35.56 Pumps and fans gains (Table 5a) (70)m= 3 3 3 3 Losses e.g. evaporation (negative value) (71)m= -100.48 -100.48 -100.48 -100.48 Water heating gains (Table 5) | 75.71 69.24 m only if cylinder in only in | Jul 125.6 or L9a), also 7.63 13 or L13a 168.32 or L15a), 35.56 | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 171.87 ee Table 35.56 3 | 78.87 Atter is fr Oct 125.6 16.9 ble 5 184.39 5 35.56 3 -100.48 | 81.48 om com Nov 125.6 19.73 200.2 35.56 3 | 86.58 munity h Dec 125.6 21.03 215.06 35.56 3 | | (66) (67) (68) (69) (70) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication (68)m= 224.99 227.33 221.44 208.9 Cooking gains (calculated in Appendication (69)m= 35.56 35.56 35.56 35.5 Pumps and fans gains (Table 5a) (70)m= 3 3 3 Losses e.g. evaporation (negative value) (71)m= -100.48 -100.48 -100.48 -100.48 -100.48 -100.48 | 75.71 69.24 m only if cylinder in only if cyli | Jul 125.6 or L9a), also 7.63 168.32 or L15a), a 35.56 3 -100.48 - | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 35.56 3 -100.48 | 78.87 ater is fr Oct 125.6 16.9 ble 5 184.39 5 35.56 3 -100.48 | 81.48 om com Nov 125.6 19.73 200.2 35.56 3 -100.48 | 86.58 munity h Dec 125.6 21.03 215.06 35.56 3 -100.48 | | (66) (67) (68) (69) (70) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication) (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication) (68)m= 224.99 227.33 221.44 208.9 Cooking gains (calculated in Appendication) (69)m= 35.56 35.56 35.56 35.5 Pumps and fans gains (Table 5a) (70)m= 3 3 3 3 Losses e.g. evaporation (negative value) (71)m= -100.48 -100.48 -100.48 -100.48 -100.48 Water heating gains (Table 5) -100.48 -100.48 -100.48 -100.48 -100.48 | 75.71 69.24 m only if cylinder in only if cyli | Jul 125.6 or L9a), also 7.63 13 or L13a 168.32 or L15a), 35.56 | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 35.56 3 -100.48 | 78.87 ater is fr Oct 125.6 16.9 ble 5 184.39 5 35.56 3 -100.48 | 81.48 om com Nov 125.6 19.73 200.2 35.56 3 -100.48 | 86.58 munity h Dec 125.6 21.03 215.06 35.56 3 -100.48 | | (66) (67) (68) (69) (70) |
| (65)m= 88.19 78.2 83.22 76.1 include (57)m in calculation of (65 5. Internal gains (see Table 5 and Metabolic gains (Table 5), Watts Jan Feb Mar Ap (66)m= 125.6 125.6 125.6 125.6 Lighting gains (calculated in Appendication) (67)m= 20.46 18.18 14.78 11.1 Appliances gains (calculated in Appendication) (68)m= 224.99 227.33 221.44 208.9 Cooking gains (calculated in Appendication) (69)m= 35.56 35.56 35.56 35.56 Pumps and fans gains (Table 5a) (70)m= 3 3 3 3 Losses e.g. evaporation (negative value) (71)m= -100.48 -100.48 -100.48 -100.48 -100.48 Water heating gains (Table 5) (72)m= 118.53 116.36 111.86 105.5 | 3 75.71 69.24 m only if cylinder in only i | Jul 125.6 or L9a), also 7.63 13 or L13a 168.32 or L15a), 35.56 3 3 -100.48 - | 72.54 welling of the second s | 71.76 or hot was Sep 125.6 Table 5 13.31 see Table 35.56 3 -100.48 | 78.87 ater is fr Oct 125.6 16.9 ble 5 184.39 5 35.56 3 -100.48 | 81.48 om com Nov 125.6 19.73 200.2 35.56 3 -100.48 | 86.58 munity h Dec 125.6 21.03 215.06 35.56 3 -100.48 | | (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.

| | ccess Factor able 6d | r | Area m² | | Flux Table 6a | | g_ Table 6b | | FF Table 6c | | Gains (W) | |
|---------------------------|-------------------------|---|------------|---|------------------|---|----------------|---|----------------|-----|--------------|------|
| Southeast 0.9x | 0.77 | x | 0.72 | x | 36.79 | x | 0.63 | x | 0.7 | = | 8.1 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 36.79 | x | 0.63 | x | 0.7 | = | 18.1 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | х | 36.79 | x | 0.63 | x | 0.7 | = | 22.6 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 36.79 | х | 0.63 | x | 0.7 |] = | 10.23 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 62.67 | x | 0.63 | x | 0.7 | = | 13.79 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 62.67 | X | 0.63 | x | 0.7 | = | 30.84 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 62.67 | x | 0.63 | x | 0.7 | = | 38.5 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 62.67 | X | 0.63 | x | 0.7 | = | 17.43 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 85.75 | x | 0.63 | x | 0.7 | = | 18.87 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 85.75 | x | 0.63 | x | 0.7 | = | 42.19 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 85.75 | x | 0.63 | x | 0.7 | = | 52.68 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 85.75 | x | 0.63 | x | 0.7 | = | 23.85 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 106.25 | x | 0.63 | x | 0.7 | = | 23.38 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 106.25 | x | 0.63 | x | 0.7 | = | 52.28 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 106.25 | x | 0.63 | x | 0.7 | = | 65.27 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 106.25 | x | 0.63 | x | 0.7 | = | 29.55 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 119.01 | x | 0.63 | x | 0.7 | = | 26.19 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 119.01 | x | 0.63 | x | 0.7 | = | 58.56 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 119.01 | x | 0.63 | x | 0.7 | = | 73.11 | (77) |
| Southeast 0.9x | 0.77 | x | 0.91 | x | 119.01 | x | 0.63 | x | 0.7 | = | 33.1 | (77) |
| Southeast 0.9x | 0.77 | x | 0.72 | x | 118.15 | x | 0.63 | x | 0.7 | = | 26 | (77) |
| Southeast 0.9x | 0.77 | x | 1.61 | x | 118.15 | x | 0.63 | x | 0.7 | = | 58.13 | (77) |
| Southeast _{0.9x} | 0.77 | X | 2.01 | X | 118.15 | x | 0.63 | x | 0.7 | = | 72.58 | (77) |
| Southeast _{0.9x} | 0.77 | X | 0.91 | X | 118.15 | x | 0.63 | x | 0.7 | = | 32.86 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 113.91 | X | 0.63 | X | 0.7 | = | 25.06 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 113.91 | X | 0.63 | X | 0.7 | = | 56.05 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | x | 113.91 | X | 0.63 | X | 0.7 | = | 69.97 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | X | 113.91 | X | 0.63 | X | 0.7 | = | 31.68 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 104.39 | x | 0.63 | x | 0.7 | = | 22.97 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 104.39 | X | 0.63 | X | 0.7 | = | 51.36 | (77) |
| Southeast 0.9x | 0.77 | X | 2.01 | X | 104.39 | X | 0.63 | X | 0.7 | = | 64.13 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 104.39 | X | 0.63 | x | 0.7 | = | 29.03 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | X | 92.85 | X | 0.63 | X | 0.7 | = | 20.43 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | X | 92.85 | X | 0.63 | X | 0.7 | = | 45.69 | (77) |
| Southeast 0.9x | 0.77 | x | 2.01 | x | 92.85 | x | 0.63 | x | 0.7 | = | 57.04 | (77) |
| Southeast 0.9x | 0.77 | X | 0.91 | x | 92.85 | x | 0.63 | x | 0.7 | = | 25.82 | (77) |
| Southeast 0.9x | 0.77 | X | 0.72 | x | 69.27 | x | 0.63 | x | 0.7 | = | 15.24 | (77) |
| Southeast 0.9x | 0.77 | X | 1.61 | x | 69.27 | x | 0.63 | x | 0.7 | = | 34.08 | (77) |
| Southeast _{0.9x} | 0.77 | X | 2.01 | X | 69.27 | x | 0.63 | X | 0.7 | = | 42.55 | (77) |

| Southeast 0.9x | 0.77 | 1 x | 0.91 | l x | 69.27 |] _x | 0.63 | X | 0.7 | 1 = | 19.26 | (77) |
|---------------------------|------|-----------------------|------|-----------------------|--------|-----------------------|------|---|-----|------------|--------|--------------------------|
| Southeast 0.9x | 0.77 | 」^] × | 0.72 |] ^] x | 44.07 |] ^] x | 0.63 | X | 0.7 |] -] = | 9.7 | $=$ $\binom{(77)}{(77)}$ |
| Southeast 0.9x | 0.77 | 」^] × | 1.61 |] ^] x | 44.07 |] ^] x | 0.63 | X | 0.7 |] -] = | 21.68 | (77) |
| Southeast 0.9x | 0.77 |] ^] _x | 2.01 |] ^] x | 44.07 |] ^] x | 0.63 | X | 0.7 |] | 27.07 | (77) |
| Southeast 0.9x | 0.77 |] ^] _x | 0.91 |] ^] x | 44.07 |] ^] _x | 0.63 | X | 0.7 |] | 12.26 | (77) |
| Southeast 0.9x | 0.77 | 」^] _× | 0.72 |] ^] x | 31.49 |] ^] x | 0.63 | X | 0.7 |] -] = | 6.93 | (77) |
| Southeast 0.9x | 0.77 | 」^] × | 1.61 |] ^] x | 31.49 |] ^] x | 0.63 | X | 0.7 |] | 15.49 | (77) |
| Southeast 0.9x | 0.77 |] ^] _x | 2.01 |] ^] x | 31.49 |] ^] _x | 0.63 | X | 0.7 |] | 19.34 | (77) |
| Southeast 0.9x | 0.77 | 」^] _× | 0.91 |] ^] x | 31.49 |] ^] x | 0.63 | X | 0.7 |] -] = | 8.76 | (77) |
| Southwest _{0.9x} | 0.77 | 」 ^] x | 0.9 |] ^] x | 36.79 |] ^] | 0.63 | X | 0.7 |] | 10.12 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] _X | 0.9 | l ^ l x | 62.67 |]] | 0.63 | X | 0.7 |] = | 17.24 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] _x | 0.9 |] ^ x | 85.75 |]] | 0.63 | X | 0.7 |] | 23.59 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] _x | 0.9 |] ^] x | 106.25 |]] | 0.63 | X | 0.7 |] | 29.22 | (79) |
| Southwest _{0.9x} | 0.77 | 」^] _× | 0.9 |] ^] x | 119.01 |]] | 0.63 | X | 0.7 |] -] = | 32.73 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] x | 0.9 |] ^] x | 118.15 |]] | 0.63 | X | 0.7 |] -] = | 32.73 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] x | 0.9 |] ^] x | 113.91 |]] | 0.63 | X | 0.7 |] | 31.33 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] _X | 0.9 |] ^] x | 104.39 |]] | 0.63 | X | 0.7 |] -] = | 28.71 | (79) |
| Southwest _{0.9x} | 0.77 | 」^] _× | 0.9 |] ^ x | 92.85 | <u> </u> | 0.63 | X | 0.7 |] -] = | 25.54 | (79) |
| Southwest _{0.9x} | 0.77 | 」^] × | 0.9 |] ^] x | 69.27 |]] | 0.63 | X | 0.7 |] | 19.05 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] _x | 0.9 |] ^] x | 44.07 |]] | 0.63 | X | 0.7 |] -] = | 12.12 | (79) |
| Southwest _{0.9x} | 0.77 |] ^] x | 0.9 |] ^] x | 31.49 | <u> </u> | 0.63 | X | 0.7 |] | 8.66 | (79) |
| Northwest 0.9x | 0.77 |] ^] x | 5.95 |] ^] x | 11.28 |]] _x | 0.63 | X | 0.7 |] | 20.52 | (81) |
| Northwest 0.9x | 0.77 |] ^] _x | 1.99 |] ^ x | 11.28 |] ^] x | 0.63 | X | 0.7 |] | 6.86 | (81) |
| Northwest 0.9x | 0.77 |] ^] x | 0.9 |] ^] x | 11.28 |] ^] _x | 0.63 | x | 0.7 |] = | 3.1 | (81) |
| Northwest 0.9x | 0.77 |] | 5.95 |] ^] _x | 22.97 |] ^] _x | 0.63 | X | 0.7 |]] = | 41.76 | (81) |
| Northwest 0.9x | 0.77 |] | 1.99 |] ^] x | 22.97 |] ^] _X | 0.63 | x | 0.7 |]] = | 13.97 | (81) |
| Northwest 0.9x | 0.77 |] x | 0.9 |] x | 22.97 |] x | 0.63 | x | 0.7 |]] = | 6.32 | (81) |
| Northwest _{0.9x} | 0.77 |] x | 5.95 |) x | 41.38 |] x | 0.63 | X | 0.7 |]] = | 75.24 | (81) |
| Northwest 0.9x | 0.77 |] x | 1.99 | x | 41.38 |) x | 0.63 | x | 0.7 |] = | 25.17 | (81) |
| Northwest 0.9x | 0.77 |]] | 0.9 |] x | 41.38 |]] x | 0.63 | X | 0.7 |]] = | 11.38 | (81) |
| Northwest _{0.9x} | 0.77 |] X | 5.95 |) x | 67.96 |]] x | 0.63 | x | 0.7 |]] = | 123.57 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | x | 67.96 |) x | 0.63 | x | 0.7 |] = | 41.33 | (81) |
| Northwest 0.9x | 0.77 | X | 0.9 |) x | 67.96 |] x | 0.63 | X | 0.7 |] = | 18.69 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.95 |) x | 91.35 |) x | 0.63 | X | 0.7 |] = | 166.1 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | ı L x | 91.35 |) x | 0.63 | x | 0.7 |] = | 55.55 | (81) |
| Northwest _{0.9x} | 0.77 | X | 0.9 |) x | 91.35 |] x | 0.63 | x | 0.7 |] = | 25.12 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.95 | x | 97.38 |) x | 0.63 | x | 0.7 |]] = | 177.08 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | X | 97.38 | X | 0.63 | x | 0.7 |] = | 59.23 | (81) |
| Northwest _{0.9x} | 0.77 | X | 0.9 |) x | 97.38 |) x | 0.63 | x | 0.7 |] = | 26.79 | (81) |
| Northwest _{0.9x} | 0.77 | X | 5.95 | x | 91.1 | X | 0.63 | x | 0.7 |] = | 165.66 | (81) |
| Northwest _{0.9x} | 0.77 | X | 1.99 | X | 91.1 | X | 0.63 | X | 0.7 |] = | 55.4 | (81) |
| <u>L</u> | | _ | | ı | | ı | | I | | 1 | | |

| Northwe | est _{0.9x} | 0.77 | Х | 0. | .9 | X | 9 | 1.1 | X | 0.63 | x | 0.7 | | = | 25.06 | (81) |
|--|---|--|--|--|---|--|--|--|---|--|--|--|-------------------------|---------------------------|--------|--|
| Northwe | est _{0.9x} | 0.77 | X | 5.9 | 95 | x | 72 | 2.63 | x | 0.63 | X | 0.7 | | = | 132.06 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 1.9 | 99 | x | 72 | 2.63 | x | 0.63 | x | 0.7 | | = | 44.17 | (81) |
| Northwe | est 0.9x | 0.77 | X | 0. | 9 | x | 72 | 2.63 | x | 0.63 | x | 0.7 | | = | 19.98 | (81) |
| Northwe | est _{0.9x} | 0.77 | Х | 5.9 | 95 | x | 50 |).42 | x | 0.63 | x | 0.7 | | = | 91.68 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 1.9 | 99 | x | 50 |).42 | x | 0.63 | × | 0.7 | | = | 30.66 | (81) |
| Northwe | est 0.9x | 0.77 | X | 0. | 9 | x | 50 |).42 | x | 0.63 | x | 0.7 | | = | 13.87 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 5.9 | 95 | x | 28 | 3.07 | x | 0.63 | x | 0.7 | | = | 51.04 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 1.9 | 99 | x | 28 | 3.07 | x | 0.63 | × | 0.7 | | = | 17.07 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 0. | .9 | x | 28 | 3.07 | x | 0.63 | x | 0.7 | | = | 7.72 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 5.9 | 95 | x | 14 | 4.2 | x | 0.63 | x | 0.7 | | = | 25.82 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 1.9 | 99 | x | 14 | 4.2 | x | 0.63 | x | 0.7 | | = | 8.63 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 0. | .9 | x | 14 | 4.2 | x | 0.63 | x | 0.7 | | = | 3.9 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 5.9 | 95 | x | 9. | .21 | x | 0.63 | x | 0.7 | | = | 16.76 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 1.9 | 99 | x | 9. | .21 | x | 0.63 | x | 0.7 | | = | 5.6 | (81) |
| Northwe | est _{0.9x} | 0.77 | X | 0. | .9 | x | 9. | .21 | x | 0.63 | x | 0.7 | | = | 2.53 | (81) |
| | | | | | | | | | - | | | | | | | |
| Solar g | ains in | watts, ca | alculated | for eac | h mont | h | | | (83)m | ı = Sum(74)m | (82)r | า | | | | |
| (83)m= | 99.64 | 179.84 | 272.96 | 383.29 | 470.46 | \neg | 85.16 | 460.22 | 392 | .41 310.73 | 206. | 02 121.19 | 9 84 | .08 |] | (83) |
| Total ga | ains – i | nternal a | nd solar | (84)m = | = (73)m | 1 + (| 83)m , | watts | • | • | | • | | | • | |
| (84)m= | 527.3 | 605.39 | 684.73 | 772.82 | 837.38 | 8 | 30.32 | 791.26 | 729 | .51 659.27 | 577 | 517.96 | 5 500 | 0.22 |] | (84) |
| | | | | | | | | | | I | 1 | | | | | |
| 7 Mea | an inter | nal temp | erature | (heating | ı seaso | n) | | | | | | | | | | |
| | | nal temp | | ` | | | area fr | om Tab | ole 9. | Th1 (°C) | | | | | 21 | (85) |
| Tempe | erature | during h | eating p | eriods i | n the liv | /ing | | | ole 9 | Th1 (°C) | | | | | 21 | (85) |
| Tempe | erature tion fac | during h | eating pains for | eriods in | n the live ea, h1, | ving m (s | ee Tab | ole 9a) | | | T 00 | et Nov | , [| Dec | 21 | (85) |
| Tempe | erature | during h | eating p | eriods i | n the liv | ving m (s | | | | ug Sep | 0.9 | + | + | Dec 1 | 21 | (85) |
| Tempe Utilisa (86)m= | erature tion fac Jan 1 | during heter for garage | eating pains for Mar | eriods ii iving ard Apr 0.95 | n the livea, h1,i May | ving m (s | ee Tab Jun ^{0.7} | Jul 0.53 | 0.5 | ug Sep 59 0.84 | + - | - | + | | 21 | |
| Tempe Utilisa (86)m= | erature tion fac Jan 1 interna | during heter for garage Feb 0.99 | eating pains for Mar 0.99 | eriods ii iving ard Apr 0.95 living ar | n the livea, h1,1 May 0.87 | ving m (s | ee Tab Jun 0.7 | ole 9a) Jul 0.53 os 3 to 7 | 0.5 | ug Sep 59 0.84 Table 9c) | 0.9 | 7 0.99 | | 1 | 21 | (86) |
| Tempe Utilisa (86)m= Mean (87)m= | erature tion fac Jan 1 interna | during heter for garage for for garage for for garage for for garage for | eating pains for Mar 0.99 ature in 20.13 | eriods in iving are Apr 0.95 living ar 20.48 | n the livea, h1,i May 0.87 ea T1 (| ring m (s r | ee Tab Jun 0.7 ow step 20.95 | Jul 0.53 os 3 to 7 20.99 | 0.57 in T | ug Sep 9 0.84 able 9c) 98 20.86 | + - | 7 0.99 | | | 21 | |
| Tempe Utilisa (86)m= Mean (87)m= | erature tion fac Jan 1 interna | during heter for garage feb 0.99 I temperation 19.86 during heter for garage feb 19.86 | eating pains for Mar 0.99 ature in 20.13 | eriods in iving are Apr 0.95 diving are 20.48 eriods in | n the livea, h1,i May 0.87 ea T1 (| ring m (s | ee Tab Jun 0.7 w step 20.95 velling | Jul 0.53 os 3 to 7 20.99 | 0.57 in T | ug Sep 59 0.84 Table 9c) | 0.9 | 7 0.99 8 20.03 | 19 | 1 | 21 | (86) |
| Tempe Utilisa (86)m= Mean (87)m= | erature tion fac Jan 1 interna | during heter for garage for for garage for for garage for for garage for | eating pains for Mar 0.99 ature in 20.13 | eriods in iving are Apr 0.95 living ar 20.48 | n the livea, h1,i May 0.87 ea T1 (| ring m (s | ee Tab Jun 0.7 ow step 20.95 | Jul 0.53 os 3 to 7 20.99 | 0.57 in T | ug Sep 99 0.84 Table 9c) 98 20.86 O, Th2 (°C) | 0.9 | 7 0.99 8 20.03 | 19 | 1 | 21 | (86) |
| Tempe Utilisa (86)m= Mean (87)m= Tempe (88)m= | erature tion fac Jan 1 interna 19.7 erature 19.91 | during heter for garage feb 0.99 I temperation 19.86 during heter for garage feb 19.86 | eating pains for Mar 0.99 ature in 20.13 eating pains 19.91 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c | ring m (s | ee Tab Jun 0.7 ww step 20.95 velling 1 9.93 | Jul 0.53 os 3 to 7 20.99 from Ta | Ai 0.57 in T 20. | ug Sep 99 0.84 Table 9c) 98 20.86 O, Th2 (°C) | 20.4 | 7 0.99 8 20.03 | 19 | 0.68 | 21 | (86) |
| Tempe Utilisa (86)m= Mean (87)m= Tempe (88)m= | erature tion fac Jan 1 interna 19.7 erature 19.91 | during heter for garage feb 0.99 l tempera 19.86 during h | eating pains for Mar 0.99 ature in 20.13 eating pains 19.91 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c | ring (s | ee Tab Jun 0.7 ww step 20.95 velling 1 9.93 | Jul 0.53 os 3 to 7 20.99 from Ta | Ai 0.57 in T 20. | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 | 20.4 | 0.99 8 20.03 2 19.92 | 19 | 0.68 | 21 | (86) |
| Temper (86)m= [Mean (87)m= [Temper (88)m= [Utilisar (89)m= [| erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 | during heter for garage for for g | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 rest of decrease of | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c 19.92 welling 0.82 | ring m (s | Jun 0.7 ww step 20.95 velling 19.93 m (see 0.6 | ole 9a) Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 | Ai 0.57 in T 20. able 9 19. 9a) 0.4 | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 | 0.9 20.4 19.9 | 0.99 8 20.03 2 19.92 | 19 | 0.68 | 21 | (86) (87) (88) |
| Temper (86)m= [Mean (87)m= [Temper (88)m= [Utilisar (89)m= [| erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 | during heter for garage for for g | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 rest of decrease of | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c 19.92 welling 0.82 | ring (s (s / l) (s / l | Jun 0.7 ww step 20.95 velling 19.93 m (see 0.6 | ole 9a) Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 | Ai 0.57 in T 20. able 9 19. 9a) 0.4 | ug Sep 99 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 17 0.77 to 7 in Tab | 0.9 20.4 19.9 | 7 0.99 8 20.03 2 19.92 6 0.99 | 19 | 0.68 | 21 | (86) (87) (88) |
| Tempe Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean | erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna | during heter for gase of the second s | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in | eriods in iving are 0.95 living are 20.48 eriods in 19.92 rest of done 0.94 the rest | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest co 19.92 welling 0.82 of dwe | ring (s (s / l) (s / l | ee Tab Jun 0.7 w step 20.95 velling t 9.93 m (see 0.6 T2 (fo | Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 Illow ste | A 0.57 in T 20. able 9 19. 9a) 0.4 | ug Sep 99 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 17 0.77 to 7 in Tab 93 19.82 | 0.9 20.4 19.9 0.9 0.9 19.3 | 7 0.99 8 20.03 2 19.92 6 0.99 | 19 | 0.68 | 21 | (86) (87) (88) (89) |
| Temper (86)m= [Mean (87)m= [Temper (88)m= [Utilisar (89)m= [Mean (90)m= [| erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 | during heter for gase of the second s | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 rest of do 0.94 the rest 19.32 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c 19.92 welling 0.82 of dwe 19.71 | ring m (s follo | ee Tab Jun 0.7 w step 20.95 relling f 9.93 m (see 0.6 T2 (fo | Jul 0.53 0.53 0.53 0.53 0.53 0.53 0.53 0.99 0.41 0.41 19.93 19.93 | A 0.5.7 in T 20. able 9 19. 0.4 eps 3 | ug Sep 99 0.84 Table 9c) 98 20.86 O, Th2 (°C) 94 19.93 To 7 in Tab 93 19.82 | 0.9 19.9 0.9 19.3 19.3 19.3 | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 | 19 | 0.68 | | (86) (87) (88) (89) |
| Temper Utilisar (86)m= [Mean (87)m= [Temper (88)m= [Utilisar (89)m= [Mean (90)m= [| erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 | during heter for gase to represent the second secon | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 rest of decrease 19.32 rest of de | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest of 19.92 welling 0.82 of dwe 19.71 | ring m (s / l / l / l / l / l / l / l / l / l / | ee Tab Jun 0.7 w step 0.95 velling to 19.93 m (see 19.9) T2 (fo 19.9) g) = fL | Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 Illow ste 19.93 | 9a) 0.4 0.5 19. | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 7 0.77 to 7 in Tab 93 19.82 — fLA) × T2 | 0.9 20.4 19.9 0.9 0.9 19.3 fLA = L | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 iving area ÷ | 19 | 1 0.68 0.92 1 | | (86) (87) (88) (89) (90) (91) |
| Temper (86)m= [Mean (87)m= [Temper (88)m= [Utilisar (89)m= [Mean (90)m= [Mean (90)m= [| erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 interna 18.78 | during heter for gase of the second s | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 ature (for 19.32 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 eest of do 0.94 the rest 19.32 er the whole 19.77 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c 19.92 welling 0.82 of dwe 19.71 | ring m (s follo 2 f dw 1 h2 llling ellin | ee Tab Jun 0.7 w step 20.95 relling f 9.93 m (see 0.6 T2 (fo 19.9 g) = fL | Jul 0.53 0.53 0.53 0.53 0.53 0.53 0.53 0.41 19.93 19.93 19.93 19.93 19.93 | A 0.5. 7 in T 20. able 9 19. 9a) 0.4 + (1 20. | ug Sep 99 0.84 Table 9c) 98 20.86 0, Th2 (°C) 94 19.93 17 0.77 to 7 in Tab 93 19.82 — fLA) × T2 34 20.23 | 0.9 19.9 0.9 19.3 fLA = L | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 iving area ÷ | 19 | 0.68 | | (86) (87) (88) (89) |
| Temper Utilisa (86)m= Mean (87)m= Temper (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply | erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 interna 18.78 adjustr | during heter for gase of the start for gase of gase of the start for gase of the start f | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 ature (for 19.32 the mean section of the mean se | eriods in iving are 0.95 living are 20.48 eriods in 19.92 rest of d 0.94 the rest 19.32 rest of the rest 19.32 rest of the what internal i | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest of 19.92 welling 0.82 of dwe 19.71 nole dw 20.13 I tempe | ring (s follo | ee Tab Jun 0.7 w step 20.95 velling to 19.93 m (see 19.9 T2 (fo 19.9) g) = fL 19.9 ure from | Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 lllow ste 19.93 A × T1 20.34 m Table | 9a) 0.4 0.5 4eps 3 19. | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 7 0.77 to 7 in Tab 93 19.82 — fLA) × T2 34 20.23 where appl | 0.9 19.9 0.9 0.9 0.9 19.3 fLA = L | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 iving area ÷ 7 19.2 | 19 19 18 (4) = | 1 0.68 0.92 1 1 3.16 | | (86) (87) (88) (89) (90) (91) |
| Temper Utilisa (86)m= Mean (87)m= Temper (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= | erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 interna 18.78 adjustr 18.78 | during heter for gase of the second s | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 ature (for 19.32 ne mean 19.32 | eriods in iving are 0.95 living are 20.48 eriods in 19.92 eest of do 0.94 the rest 19.32 er the whole 19.77 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest c 19.92 welling 0.82 of dwe 19.71 | ring (s follo | ee Tab Jun 0.7 w step 20.95 relling f 9.93 m (see 0.6 T2 (fo 19.9 g) = fL | Jul 0.53 0.53 0.53 0.53 0.53 0.53 0.53 0.41 19.93 19.93 19.93 19.93 19.93 | A 0.5. 7 in T 20. able 9 19. 9a) 0.4 + (1 20. | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 7 0.77 to 7 in Tab 93 19.82 — fLA) × T2 34 20.23 where appl | 0.9 19.9 0.9 19.3 fLA = L | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 iving area ÷ 7 19.2 | 19 19 18 (4) = | 1 0.68 0.92 1 | | (86) (87) (88) (89) (90) (91) |
| Temper Utilisa (86)m= Mean (87)m= Temper (88)m= Utilisa (89)m= Mean (90)m= Mean (90)m= Apply (93)m= 8. Spa | erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 interna 18.78 adjustr 18.78 | during heter for gase store for gase | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 ature (for 19.32 the mean 19.32 direment | eriods in iving are Apr 0.95 living are 20.48 eriods in 19.92 eest of do 0.94 the rest 19.32 er the what 19.77 internal 19.77 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest of 19.92 welling 0.82 of dwe 19.71 nole dw 20.13 I temper | ring m (s follo 2 ff dw 1 llling cellin 2 ceratu 2 | ee Tab Jun 0.7 w step 0.95 velling to the step of | Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 lllow ste 19.93 A × T1 20.34 m Table 20.34 | 9a) 0.4 eps 3 19. + (1 20. | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 7 0.77 to 7 in Tab 93 19.82 — fLA) × T2 34 20.23 where appl 34 20.23 | 0.9 20.4 19.9 0.9 0.9 19.3 fLA = L 2 19.7 ropriat | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 iving area ÷ 7 19.2 9 7 19.2 | 19 19 18 (4) = | 1 0.68 0.92 1 1 3.16 3.75 | 0.39 | (86) (87) (88) (89) (90) (91) |
| Temper Utilisa (86)m= Mean (87)m= Temper (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Span Set Ti | erature tion fac Jan 1 interna 19.7 erature 19.91 tion fac 1 interna 18.19 interna 18.78 adjustr 18.78 ace hea to the i | during heter for gase store for gase | eating pains for Mar 0.99 ature in 20.13 eating pains for 0.98 ature in 18.81 ature (for 19.32 the mean 19.32 direment ternal te | eriods in iving are 0.95 living are 20.48 eriods in 19.92 erest of do 0.94 the rest 19.32 er the whole 19.77 internation internation in the rest 19.77 eriods in the rest 1 | n the livea, h1,1 May 0.87 ea T1 (20.78 n rest of 19.92 welling 0.82 of dwe 19.71 nole dw 20.13 I temper 20.13 re obta | ring m (s follo 2 ff dw 1 llling cellin 2 ceratu 2 | ee Tab Jun 0.7 w step 0.95 velling to the step of | Jul 0.53 os 3 to 7 20.99 from Ta 19.93 e Table 0.41 lllow ste 19.93 A × T1 20.34 m Table 20.34 | 9a) 0.4 eps 3 19. + (1 20. | ug Sep 9 0.84 Table 9c) 98 20.86 9, Th2 (°C) 94 19.93 7 0.77 to 7 in Tab 93 19.82 — fLA) × T2 34 20.23 where appl | 0.9 20.4 19.9 0.9 0.9 19.3 fLA = L 2 19.7 ropriat | 7 0.99 8 20.03 2 19.92 6 0.99 2 18.67 iving area ÷ 7 19.2 9 7 19.2 | 19 19 18 (4) = | 1 0.68 0.92 1 1 3.16 3.75 | 0.39 | (86) (87) (88) (89) (90) (91) |

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

| Utilisation factor f | or gains, hr | n: | | | | | | | | | | |
|------------------------------|--------------|-------------|--------------|----------|----------------|---|-------------------|-----------------------|-------------------------|------------------------|----------|-------|
| (94)m= 1 0.9 | <u> </u> | 0.93 | 0.83 | 0.64 | 0.46 | 0.52 | 0.79 | 0.96 | 0.99 | 1 | | (94) |
| Useful gains, hm | im , W = (9 | 94)m x (8 | 4)m | | | | | | l | | | |
| (95)m= 524.75 599 | 51 668.92 | 722.07 | 692.84 | 529.2 | 361.3 | 376.27 | 520.87 | 551.99 | 512.97 | 498.33 | | (95) |
| Monthly average | xternal ter | nperature | e from Ta | able 8 | | | | | | | | |
| (96)m= 4.3 4. | 6.5 | 8.9 | 11.7 | 14.6 | 16.6 | 16.4 | 14.1 | 10.6 | 7.1 | 4.2 | | (96) |
| Heat loss rate for | | · · | 1 | | -`` | - ` | <u> </u> | | | | | |
| (97)m= 1457.45 141 | | | 832.45 | 557.79 | 365.77 | 384.17 | 601.13 | 905.48 | 1200.29 | 1450.19 | | (97) |
| Space heating re | | | | r | 1 | - `` | `` | ŕ | | l === . = 1 | | |
| (98)m= 693.93 54 | .2 457.65 | 254.82 | 103.87 | 0 | 0 | 0 | 0 | 263 | 494.87 | 708.18 | | 1,000 |
| | | | | | | Tota | ıl per year | (kWh/yeaı | r) = Sum(9 | 8) _{15,912} = | 3523.53 | (98) |
| Space heating re- | uirement i | n kWh/m² | ²/year | | | | | | | | 42.61 | (99) |
| 9a. Energy require | nents – Ind | dividual h | eating sy | ystems i | ncluding | micro-C | CHP) | | | | | |
| Space heating: | | | | | | | | | | ı | | 7 |
| Fraction of space | heat from s | secondar | y/supple | mentary | system | | | | | | 0 | (201) |
| Fraction of space | heat from i | main syst | tem(s) | | | (202) = 1 | - (201) = | | | | 1 | (202) |
| Fraction of total h | eating from | main sy | stem 1 | | | (204) = (2 | 02) x [1 – | (203)] = | | | 1 | (204) |
| Efficiency of main | space hea | iting syste | em 1 | | | | | | | | 93.5 | (206) |
| Efficiency of seco | ndary/supp | lementar | y heating | g systen | ո, % | | | | | | 0 | (208) |
| Jan F | b Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | kWh/yea | ır |
| Space heating re | uirement (| calculate | d above) |) | | | · | | I. | | · | |
| 693.93 54 | .2 457.65 | 254.82 | 103.87 | 0 | 0 | 0 | 0 | 263 | 494.87 | 708.18 | | |
| (211) m = {[(98)m x | (204)] } x | 100 ÷ (20 | 06) | - | - | - | - | - | - | | | (211) |
| 742.17 585 | 24 489.47 | 272.54 | 111.09 | 0 | 0 | 0 | 0 | 281.28 | 529.28 | 757.42 | | |
| | | | | | | Tota | ıl (kWh/yea | ar) =Sum(2 | 211) | = | 3768.48 | (211) |
| Space heating fue | l (seconda | ry), kWh | month/ | | | | | | | • | | |
| $= \{[(98)m \times (201)]\}$ | x 100 ÷ (2 | 08) | | - | | | | | | | | |
| (215)m = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 7 |
| | | | | | | Tota | ıl (kWh/yea | ar) =Sum(2 | 215) _{15,1012} | = | 0 | (215) |
| Water heating | | | | | | | | | | | | |
| Output from water | | | 162.19 | 144.85 | 139.03 | 152.67 | 152.43 | 171.69 | 181.64 | 194.88 | | |
| Efficiency of water | | 100.07 | 102.10 | 144.00 | 100.00 | 102.07 | 102.40 | 17 1.00 | 101.04 | 104.00 | 79.8 | (216) |
| (217)m= 87.87 87 | <u> </u> | 85.96 | 83.66 | 79.8 | 79.8 | 79.8 | 79.8 | 85.95 | 87.36 | 87.96 | 73.0 | (217) |
| Fuel for water hear | I | | 00.00 | 70.0 | 7 0.0 | 7 0.0 | 7 0.0 | 00.00 | 07.00 | 07.00 | | (= , |
| (219)m = (64)m x | | | | | | | | | | | | |
| (219)m= 227.29 200 | 82 212.05 | 192.61 | 193.87 | 181.51 | 174.22 | 191.31 | 191.02 | 199.76 | 207.93 | 221.57 | | |
| | | | | | | Tota | al = Sum(2 | 19a) ₁₁₂ = | | | 2393.96 | (219) |
| Annual totals | | | | | | | | k' | Wh/year | | kWh/year | 7 |
| Space heating fuel | used, mair | n system | 1 | | | | | | | | 3768.48 | _ |
| Water heating fuel | used | | | | | | | | | | 2393.96 | |
| Electricity for pump | e fane and | d alactric | keen-ho | t | | | | | | | | |

| central heating pump: | | | 30 | | (230c) |
|---|---------------------------------|-----------------------------|-----|-------------------------|--------|
| boiler with a fan-assisted flue | | | 45 | | (230e) |
| Total electricity for the above, kWh/year | sum of (230 | a)(230g) = | | 75 | (231) |
| Electricity for lighting | | | | 361.4 | (232) |
| Total delivered energy for all uses (211)(221) + | (231) + (232)(237b) = | | | 6598.85 | (338) |
| 12a. CO2 emissions – Individual heating system | s including micro-CHP | | | | |
| | Energy kWh/year | Emission fact kg CO2/kWh | tor | Emissions kg CO2/yea | ır |
| Space heating (main system 1) | (211) x | 0.216 | = | 813.99 | (261) |
| Space heating (secondary) | (215) x | 0.519 | = | 0 | (263) |
| Water heating | (219) x | 0.216 | = | 517.1 | (264) |
| Space and water heating | (261) + (262) + (263) + (264) = | | | 1331.09 | (265) |
| Electricity for pumps, fans and electric keep-hot | (231) x | 0.519 | = | 38.93 | (267) |
| Electricity for lighting | (232) x | 0.519 | = | 187.57 | (268) |
| Total CO2, kg/year | sun | n of (265)(271) = | | 1557.58 | (272) |
| | | | | | |

TER =

(273)

27.69