elmhurst energy

SAP Report Submission for Building Regulations Compliance

Client: Asprey Homes

Project: Plot 06, Darvel Down
Netherfield, East Sussex, TN33

Contact: Stuart Searle
SRS Surveyors Ltd T/A SRS Partnership
stuart@srssurveyors.co.uk

Report Issue Date: 13/12/2021

EXCELLENCE IN ENERGY ASSESSMENT

PREDICTED ENERGY ASSESSMENT

Design SAP
elmhurst energy

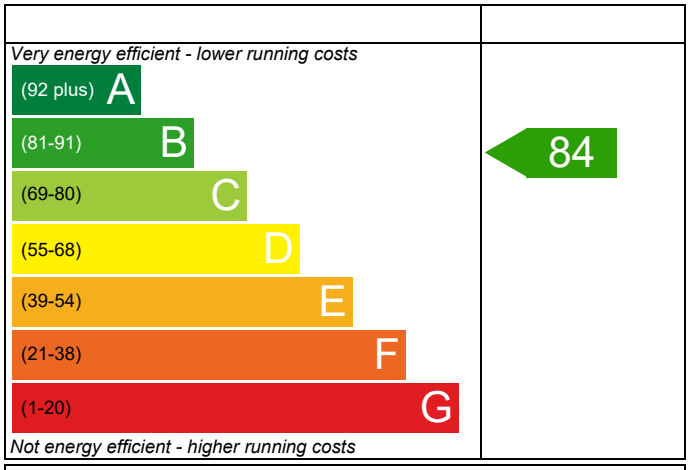
Plot 06, Darvel Down,
Netherfield,
East Sussex,
TN33

Dwelling type:	House, Mid-Terrace
Date of assessment:	13/12/2021
Produced by:	SRS Surveyors Ltd T/A SRS Partnership
Total floor area:	93.8 m²
DRRN:	3299-7228-7935

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO_2) emissions.

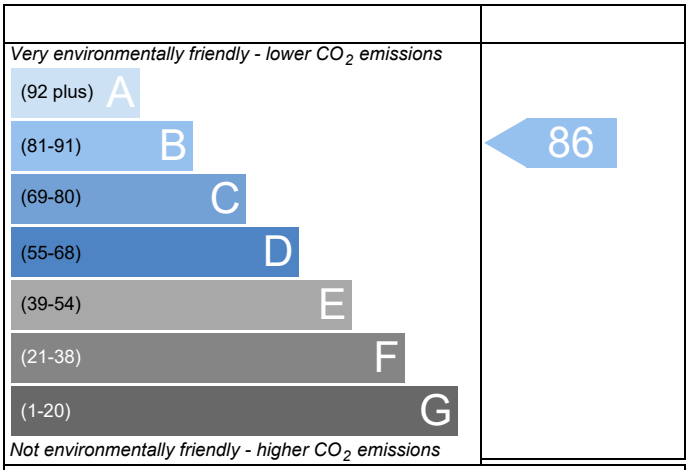
Energy Efficiency Rating



England EU Directive 2002/91/EC

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.

Environmental Impact (CO_2) Rating



England EU Directive 2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

This report has been produced by an accredited Elmhurst member whose work is subject to quality assurance audits. The data used to produce the report has been verified by the Elmhurst members' portal.

elmhurst energy APPROVED ENERGY ASSESSOR

ELMHURST ENERGY QUALITY PROMISE ACCREDITED MEMBER

Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

BUILDING REGULATION COMPLIANCE
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	19-104-00-P06	**Issued on Date**	13/12/2021
Assessment Reference	001	**Prop Type Ref**	Darvel Down
Property	Plot 06, Darvel Down, Netherfield, East Sussex, TN33		

SAP Rating	84 B	**DER**	17.88	**TER**	18.03
Environmental	86 B	**% DER<TER**	0.81		
CO_2 Emissions (t/year)	1.40	**DFEE**	46.89	**TFEE**	53.34
General Requirements Compliance	Pass	**% DFEE<TFEE**	12.10		

Assessor Details	Mr. Stuart Searle, SRS Surveyors Ltd (Consult Construct), Tel: 01227 767770, stuart.searle@consultconstruct.co.uk	**Assessor ID**	L603-0001
Client	Asprey Homes, Asprey Homes		

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.03	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	17.88	$kgCO_2/m^2$	Pass
	-0.15 (-0.8%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.34	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	46.89	$kWh/m^2/yr$	
	-6.4 (-12.0%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.13 (max. 0.25)	0.20 (max. 0.70)	Pass
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	Pass
Openings	1.26 (max. 2.00)	1.60 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	$m^3/(h.m^2)$ @ 50 Pa	
Maximum	10.0	$m^3/(h.m^2)$ @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Worcester Greenstar CDi 30 CDi Combi boiler Efficiency: 89.4% SEDBUK2009 Minimum: 88.0%		Pass
Secondary heating system	None		

5 Cylinder insulation

Hot water storage	No cylinder		

6 Controls

Space heating controls	Time and temperature zone control		Pass
Hot water controls	No cylinder		
Boiler interlock	Yes		Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous extract system (decentralised)			
Specific fan power	0.1600 0.1600 0.1800		
Maximum	0.7		Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass

Based on:

Overshading	Average
Windows facing North East	7.88 m², No overhang
Windows facing South West	5.05 m², No overhang
Air change rate	4.00 ach
Blinds/curtains	Light-coloured curtain or roller blind, closed 50% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m²K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	m³/(h.m²) @ 50 Pa	
Maximum	10.0	m³/(h.m²) @ 50 Pa	Pass

10 Key features

Party wall U-value	0.00	W/m²K
Roof U-value	0.09	W/m²K
Floor U-value	0.10	W/m²K

This report has been produced by an accredited Elmhurst member whose work is subject to quality assurance audits. The data used to produce the report has been verified by the Elmhurst members' portal.

FULL SAP CALCULATION PRINTOUT
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	19-104-00-P06	**Issued on Date**	13/12/2021
Assessment Reference	001	**Prop Type Ref**	Darvel Down
Property	Plot 06, Darvel Down, Netherfield, East Sussex, TN33		

SAP Rating	84 B	**DER**	17.88	**TER**	18.03
Environmental	86 B	**% DER<TER**	0.81		
CO_2 Emissions (t/year)	1.40	**DFEE**	46.89	**TFEE**	53.34
General Requirements Compliance	Pass	**% DFEE<TFEE**	12.10		

Assessor Details	Mr. Stuart Searle, SRS Surveyors Ltd (Consult Construct), Tel: 01227 767770, stuart.searle@consultconstruct.co.uk	**Assessor ID**	L603-0001
Client	Asprey Homes, Asprey Homes		

REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

DWELLING AS DESIGNED

Mid-Terrace House, total floor area 94 m²

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:Mains gas
Fuel factor:1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 18.03 kgCO□/m²
Dwelling Carbon Dioxide Emission Rate (DER) 17.88 kgCO□/m²OK

1b TFEE and DFEE
Target Fabric Energy Efficiency (TFEE)53.3 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)46.9 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.13 (max. 0.25)	0.20 (max. 0.70)	OK
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	OK
Openings	1.26 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability
Air permeability at 50 pascals: 5.00 (design value)
Maximum 10.0 OK

4 Heating efficiency
Main heating system: Boiler system with radiators or underfloor - Mains gas
Data from database
Worcester Greenstar CDi 30 CDi
Combi boiler
Efficiency: 89.4% SEDBUK2009
Minimum: 88.0% OK

Secondary heating system: None

5 Cylinder insulation
Hot water storage: No cylinder

6 Controls
Space heating controls: Time and temperature zone control OK

Hot water controls: No cylinder

Boiler interlock: Yes OK

7 Low energy lights
Percentage of fixed lights with low-energy fittings:100%
Minimum 75% OK

8 Mechanical ventilation
Continuous extract system (decentralised)
Specific fan power: 0.1600 0.1600 0.1800
Maximum 0.7 OK

9 Summertime temperature
Overheating risk (Thames Valley): Not significant OK
Based on:
Overshading: Average
Windows facing North East: 7.88 m², No overhang
Windows facing South West: 5.05 m², No overhang
Air change rate: 4.00 ach
Blinds/curtains: Light-coloured curtain or roller blind, closed 50% of daylight hours

10 Key features
Party wall U-value 0.00 W/m²K
Roof U-value 0.09 W/m²K
Floor U-value 0.10 W/m²K

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	38.5400 (1b)	x	2.3900 (2b)	=	92.1106	(1b) - (3b)
First floor	55.2600 (1c)	x	2.6000 (2c)	=	143.6760	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.8000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	235.7866	(5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000	(6b)
Number of intermittent fans							0 * 10 =	0.0000	(7a)
Number of passive vents							0 * 10 =	0.0000	(7b)
Number of flueless gas fires							0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.2500	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2125	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.2709	0.2656	0.2603	0.2338	0.2284	0.2019	0.2019	0.1966	0.2125	0.2284	0.2391	0.2497	(22b)
Mechanical extract ventilation - decentralised													
If mechanical ventilation:												0.5000	(23a)
Effective ac	0.5209	0.5156	0.5103	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Glazed Entrance Door			2.1000	1.6000	3.3600			(26a)
Windows - Double (Uw = 1.20)			12.9300	1.1450	14.8053			(27)
FT1 - Ground BB			38.5400	0.1000	3.8540			(28a)
FT3 - Over Car Port			16.7200	0.2000	3.3440			(28b)
EWT1 - Brick/Block	82.1000	13.3300	68.7700	0.1900	13.0663			(29a)
EWT2 - Clad/Block	7.4200	1.7000	5.7200	0.1800	1.0296			(29a)
RT1 - Ins Ceiling	55.2600		55.2600	0.0900	4.9734			(30)
Total net area of external elements Aum(A, m2)			200.0400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.4326			(33)
PWT1: Party Wall			56.5900	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	16.4429	(36)
Total fabric heat loss (33) + (36) =	60.8755	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.5339	40.1206	39.7072	38.9048	38.9048	38.9048	38.9048	38.9048	38.9048	38.9048	38.9048	38.9048	(38)
Heat transfer coeff	101.4095	100.9961	100.5827	99.7803	99.7803	99.7803	99.7803	99.7803	99.7803	99.7803	99.7803	99.7803	(39)
Average = Sum(39)m / 12 =												100.0843	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0811	1.0767	1.0723	1.0638	1.0638	1.0638	1.0638	1.0638	1.0638	1.0638	1.0638	1.0638	(40)
HLP (average)												1.0670	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6742 (42)
Average daily hot water use (litres/day)	97.7133 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4846	103.5761	99.6676	95.7590	91.8505	87.9420	87.9420	91.8505	95.7590	99.6676	103.5761	107.4846	(44)
Energy conte	159.3966	139.4093	143.8579	125.4188	120.3423	103.8463	96.2289	110.4240	111.7428	130.2255	142.1513	154.3671	(45)
Energy content (annual)										Total = Sum(45)m =		1537.4109	(45)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

```
Distribution loss  (46)m = 0.15 x (45)m
              23.9095    20.9114    21.5787    18.8128    18.0514    15.5769    14.4343    16.5636    16.7614    19.5338    21.3227    23.1551 (46)
Water storage loss:
Total storage loss
               0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (56)
If cylinder contains dedicated solar storage
               0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (57)
Combi loss    50.9589    46.0274    50.7895    47.2236    46.8060    43.3686    44.8143    46.8060    47.2236    50.7895    49.3151    50.9589 (61)
Total heat required for water heating calculated for each month
             210.3555   185.4367   194.6474   172.6425   167.1484   147.2149   141.0431   157.2300   158.9665   181.0150   191.4664   205.3260 (62)
Solar input    0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (63)
                                                                                                 Solar input (sum of months) = Sum(63)m =      0.0000 (63)
Output from w/h
             210.3555   185.4367   194.6474   172.6425   167.1484   147.2149   141.0431   157.2300   158.9665   181.0150   191.4664   205.3260 (64)
                                                                                                   Total per year (kWh/year) = Sum(64)m =   2112.4924 (64)
Heat gains from water heating, kWh/month
              65.7391    57.8604    60.5301    53.5077    51.7153    45.3711    43.1997    48.4175    48.9604    55.9974    59.5941    64.0668 (65)
```

---

5. Internal gains (see Table 5 and 5a)

```
Metabolic gains (Table 5), Watts
                Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
(66)m      133.7122   133.7122   133.7122   133.7122   133.7122   133.7122   133.7122   133.7122   133.7122   133.7122   133.7122   133.7122 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
              23.5979    20.9594    17.0454    12.9044     9.6462     8.1437     8.7996    11.4381    15.3521    19.4931    22.7513    24.2538 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
             245.8977   248.4494   242.0193   228.3304   211.0507   194.8102   183.9605   181.4089   187.8390   201.5278   218.8076   235.0481 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
              36.3712    36.3712    36.3712    36.3712    36.3712    36.3712    36.3712    36.3712    36.3712    36.3712    36.3712    36.3712 (69)
Pumps, fans    3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000     3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
            -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698  -106.9698 (71)
Water heating gains (Table 5)
              88.3590    86.1018    81.3577    74.3162    69.5099    63.0154    58.0641    65.0773    68.0006    75.2653    82.7696    86.1113 (72)
Total internal gains
             423.9683   421.6243   406.5360   381.6648   356.3205   332.0830   316.9379   324.0379   337.3053   362.3998   390.4421   411.5268 (73)
```

---

6. Solar gains

```
[Jan]                                    Area          Solar flux                 g                FF            Access            Gains
                                           m2            Table 6a       Specific data    Specific data          factor                W
                                                            W/m2         or Table 6b      or Table 6c         Table 6d
-----------------------------------------------------------------------------------------------------------------------------------------
Northeast                                7.8800           11.2829             0.6300           0.7000          0.7700           27.1719 (75)
Southwest                                5.0500           36.7938             0.6300           0.7000          0.7700           56.7856 (79)
-----------------------------------------------------------------------------------------------------------------------------------------

Solar gains    83.9575   152.0361   231.9956   327.6364   403.6569   416.8708   395.1941   336.0130   264.7273   174.4961   102.2054    70.7866 (83)
Total gains   507.9258   573.6605   638.5316   709.3011   759.9773   748.9537   712.1320   660.0509   602.0327   536.8959   492.6474   482.3134 (84)
```

---

7. Mean internal temperature (heating season)

```
Temperature during heating periods in the living area from Table 9, Th1 (C)                                                          21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)
                Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
tau          64.2335    64.4964    64.7615    65.2823    65.2823    65.2823    65.2823    65.2823    65.2823    65.2823    65.2823    65.2823
alpha         5.2822     5.2998     5.3174     5.3522     5.3522     5.3522     5.3522     5.3522     5.3522     5.3522     5.3522     5.3522
util living area
               0.9988     0.9974     0.9930     0.9752     0.9135     0.7686     0.5979     0.6617     0.8932     0.9856     0.9975     0.9991 (86)

MIT           19.7972    19.9306    20.1627    20.4755    20.7623    20.9360    20.9865    20.9774    20.8467    20.4827    20.0890    19.7850 (87)
Th 2          20.0163    20.0199    20.0235    20.0305    20.0305    20.0305    20.0305    20.0305    20.0305    20.0305    20.0305    20.0305 (88)
util rest of house
               0.9984     0.9965     0.9904     0.9652     0.8778     0.6829     0.4757     0.5386     0.8352     0.9781     0.9964     0.9988 (89)
MIT 2         18.4025    18.5999    18.9409    19.3959    19.7860    19.9853    20.0252    20.0205    19.8981    19.4110    18.8396    18.3949 (90)
Living area fraction                                                                                    fLA = Living area / (4) =      0.1966 (91)
MIT           18.6767    18.8615    19.1811    19.6081    19.9779    20.1722    20.2142    20.2086    20.0846    19.6217    19.0853    18.6682 (92)
Temperature adjustment                                                                                                             -0.1500
adjusted MIT  18.5267    18.7115    19.0311    19.4581    19.8279    20.0222    20.0642    20.0586    19.9346    19.4717    18.9353    18.5182 (93)
```

---

8. Space heating requirement

```
                Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
Utilisation    0.9974     0.9947     0.9865     0.9572     0.8686     0.6821     0.4801     0.5424     0.8281     0.9717     0.9946     0.9980 (94)
Useful gains 506.5982   570.6051   629.9427   678.9483   660.1269   510.8534   341.9069   358.0413   498.5466   521.7231   489.9706   481.3566 (95)
Ext temp.      4.3000     4.9000     6.5000     8.9000    11.7000    14.6000    16.6000    16.4000    14.1000    10.6000     7.1000     4.2000 (96)
Heat loss rate W
            1442.7178  1394.9066  1260.4096  1053.4921   811.0053   541.0248   345.6606   365.0582   582.1737   885.2166  1180.9266  1428.6725 (97)
Month fracti   1.0000     1.0000     1.0000     1.0000     1.0000     0.0000     0.0000     0.0000     0.0000     1.0000     1.0000     1.0000 (97a)
Space heating kWh
             696.4730   553.9307   469.0674   269.6715   112.2535     0.0000     0.0000     0.0000     0.0000   270.4392   497.4883   704.8030 (98)
Space heating                                                                                                                 3574.1265 (98)
Space heating per m2                                                                                                 (98) / (4) =    38.1037 (99)
```

8c. Space cooling requirement

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	90.3000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	3958.0581	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	696.4730	553.9307	469.0674	269.6715	112.2535	0.0000	0.0000	0.0000	0.0000	270.4392	497.4883	704.8030	(98)
Space heating efficiency (main heating system 1)													
	90.3000	90.3000	90.3000	90.3000	90.3000	0.0000	0.0000	0.0000	0.0000	90.3000	90.3000	90.3000	(210)
Space heating fuel (main heating system)													
	771.2879	613.4337	519.4545	298.6395	124.3117	0.0000	0.0000	0.0000	0.0000	299.4897	550.9283	780.5127	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	210.3555	185.4367	194.6474	172.6425	167.1484	147.2149	141.0431	157.2300	158.9665	181.0150	191.4664	205.3260	(64)
Efficiency of water heater												80.2000	(216)
(217)m	87.7369	87.5352	87.0837	86.0693	83.9735	80.2000	80.2000	80.2000	80.2000	85.9595	87.2465	87.8054	(217)
Fuel for water heating, kWh/month													
	239.7571	211.8425	223.5175	200.5854	199.0489	183.5598	175.8642	196.0474	198.2126	210.5818	219.4545	233.8423	(219)
Water heating fuel used												2492.3139	(219)
Annual totals kWh/year													
Space heating fuel - main system												3958.0581	(211)
Space heating fuel - secondary												0.0000	(215)

Electricity for pumps and fans:		
(MEVDecentralised, Database: total watage = 7.2080, total flow = 37.0000, SFP = 0.1948)		
mechanical ventilation fans (SFP = 0.1948)	56.0392	(230a)
central heating pump	30.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	131.0392	(231)
Electricity for lighting (calculated in Appendix L)	416.7463	(232)
Total delivered energy for all uses	6998.1575	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3958.0581	0.2160	854.9406	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2492.3139	0.2160	538.3398	(264)
Space and water heating			1393.2803	(265)
Pumps and fans	131.0392	0.5190	68.0094	(267)
Energy for lighting	416.7463	0.5190	216.2913	(268)
Total CO2, kg/year			1677.5810	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			17.8800	(273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER		17.8800	ZC1
Total Floor Area	TFA	93.8000	
Assumed number of occupants	N	2.6742	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		15.5345	ZC2
CO2 emissions from cooking, equation (L16)		1.9529	ZC3
Total CO2 emissions		35.3674	ZC4
Residual CO2 emissions offset from biofuel CHP		0.0000	ZC5
Additional allowable electricity generation, kWh/m²/year		0.0000	ZC6
Resulting CO2 emissions offset from additional allowable electricity generation		0.0000	ZC7
Net CO2 emissions		35.3674	ZC8

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	38.5400	(1b)	x 2.3900	(2b) =	92.1106	(1b) - (3b)
First floor	55.2600	(1c)	x 2.6000	(2c) =	143.6760	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.8000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		235.7866	(5)

2. Ventilation rate

	main heating		secondary heating		other		total		m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =		0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =		0.0000	(6b)
Number of intermittent fans							3 * 10 =		30.0000	(7a)
Number of passive vents							0 * 10 =		0.0000	(7b)
Number of flueless gas fires							0 * 40 =		0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1272	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.3772	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3206	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4088	0.4008	0.3928	0.3527	0.3447	0.3046	0.3046	0.2966	0.3206	0.3447	0.3607	0.3768	(22b)
Effective ac	0.5836	0.5803	0.5771	0.5622	0.5594	0.5464	0.5464	0.5440	0.5514	0.5594	0.5651	0.5710	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Semi-glazed door			2.1000	1.2000	2.5200			(26a)
TER Opening Type (Uw = 1.40)			12.9300	1.3258	17.1420			(27)
FT1 - Ground BB			38.5400	0.1300	5.0102			(28a)
FT3 - Over Car Port			16.7200	0.1300	2.1736			(28b)
EWT1 - Brick/Block	82.1000	13.3300	68.7700	0.1800	12.3786			(29a)
EWT2 - Clad/Block	7.4200	1.7000	5.7200	0.1800	1.0296			(29a)
RT1 - Ins Ceiling	55.2600		55.2600	0.1300	7.1838			(30)
Total net area of external elements Aum(A, m2)			200.0400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		47.4378			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	12.6076	(36)
Total fabric heat loss (33) + (36) =	60.0454	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.4073	45.1548	44.9073	43.7448	43.5273	42.5148	42.5148	42.3273	42.9048	43.5273	43.9673	44.4273	(38)
Heat transfer coeff	105.4528	105.2003	104.9528	103.7903	103.5728	102.5603	102.5603	102.3727	102.9503	103.5728	104.0128	104.4728	(39)
Average = Sum(39)m / 12 =												103.7892	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1242	1.1215	1.1189	1.1065	1.1042	1.0934	1.0934	1.0914	1.0976	1.1042	1.1089	1.1138	(40)
HLP (average)												1.1065	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6742 (42)
Average daily hot water use (litres/day)	97.7133 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4846	103.5761	99.6676	95.7590	91.8505	87.9420	87.9420	91.8505	95.7590	99.6676	103.5761	107.4846	(44)
Energy conte	159.3966	139.4093	143.8579	125.4188	120.3423	103.8463	96.2289	110.4240	111.7428	130.2255	142.1513	154.3671	(45)
Energy content (annual)										Total = Sum(45)m =		1537.4109	(45)
Distribution loss (46)m = 0.15 x (45)m	23.9095	20.9114	21.5787	18.8128	18.0514	15.5769	14.4343	16.5636	16.7614	19.5338	21.3227	23.1551	(46)
Water storage loss:													
Total storage loss													

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	50.9589	46.0274	50.7895	47.2236	46.8060	43.3686	44.8143	46.8060	47.2236	50.7895	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	210.3555	185.4367	194.6474	172.6425	167.1484	147.2149	141.0431	157.2300	158.9665	181.0150	191.4664	205.3260	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	210.3555	185.4367	194.6474	172.6425	167.1484	147.2149	141.0431	157.2300	158.9665	181.0150	191.4664	205.3260	(64)
								Total per year (kWh/year) = Sum(64)m =				2112.4924	(64)
Heat gains from water heating, kWh/month													
	65.7391	57.8604	60.5301	53.5077	51.7153	45.3711	43.1997	48.4175	48.9604	55.9974	59.5941	64.0668	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.5979	20.9594	17.0454	12.9044	9.6462	8.1437	8.7996	11.4381	15.3521	19.4931	22.7513	24.2538	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.8977	248.4494	242.0193	228.3304	211.0507	194.8102	183.9605	181.4089	187.8390	201.5278	218.8076	235.0481	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	(71)
Water heating gains (Table 5)													
	88.3590	86.1018	81.3577	74.3162	69.5099	63.0154	58.0641	65.0773	68.0006	75.2653	82.7696	86.1113	(72)
Total internal gains													
	423.9683	421.6243	406.5360	381.6648	356.3205	332.0830	316.9379	324.0379	337.3053	362.3998	390.4421	411.5268	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	7.8800	11.2829	0.6300	0.7000	0.7700	27.1719	(75)
Southwest	5.0500	36.7938	0.6300	0.7000	0.7700	56.7856	(79)

Solar gains	83.9575	152.0361	231.9956	327.6364	403.6569	416.8708	395.1941	336.0130	264.7273	174.4961	102.2054	70.7866	(83)
Total gains	507.9258	573.6605	638.5316	709.3011	759.9773	748.9537	712.1320	660.0509	602.0327	536.8959	492.6474	482.3134	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.7707	61.9189	62.0650	62.7601	62.8919	63.5128	63.5128	63.6291	63.2722	62.8919	62.6259	62.3501	
alpha	5.1180	5.1279	5.1377	5.1840	5.1928	5.2342	5.2342	5.2419	5.2181	5.1928	5.1751	5.1567	
util living area													
	0.9988	0.9974	0.9933	0.9768	0.9199	0.7795	0.6110	0.6738	0.8999	0.9863	0.9975	0.9991	(86)
MIT	19.7388	19.8712	20.1063	20.4318	20.7333	20.9266	20.9837	20.9735	20.8296	20.4471	20.0372	19.7167	(87)
Th 2	19.9811	19.9833	19.9854	19.9955	19.9974	20.0062	20.0062	20.0079	20.0028	19.9974	19.9936	19.9896	(88)
util rest of house													
	0.9984	0.9965	0.9907	0.9672	0.8854	0.6933	0.4845	0.5475	0.8431	0.9791	0.9964	0.9988	(89)
MIT 2	18.2918	18.4869	18.8311	19.3074	19.7216	19.9540	19.9998	19.9961	19.8546	19.3354	18.7374	18.2656	(90)
Living area fraction									fLA = Living area / (4) =			0.1966	(91)
MIT	18.5763	18.7591	19.0818	19.5284	19.9205	20.1452	20.1932	20.1882	20.0463	19.5540	18.9929	18.5509	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5763	18.7591	19.0818	19.5284	19.9205	20.1452	20.1932	20.1882	20.0463	19.5540	18.9929	18.5509	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9974	0.9949	0.9875	0.9613	0.8822	0.7066	0.5094	0.5721	0.8461	0.9745	0.9949	0.9980	(94)
Useful gains	506.6300	570.7387	630.5507	681.8534	670.4170	529.2226	362.7727	377.5929	509.3813	523.1999	490.1109	481.3688	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1505.4736	1457.9775	1320.4901	1103.1250	851.4169	568.7176	368.5231	387.8100	612.1681	927.3859	1237.0162	1499.2735	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	743.1396	596.2245	513.3149	303.3155	134.6640	0.0000	0.0000	0.0000	0.0000	300.7144	537.7718	757.3211	(98)
Space heating												3886.4658	(98)
Space heating per m2											(98) / (4) =	41.4335	(99)

8c. Space cooling requirement

Not applicable

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												93.4000	(206)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement												4161.0983	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	743.1396	596.2245	513.3149	303.3155	134.6640	0.0000	0.0000	0.0000	0.0000	300.7144	537.7718	757.3211	(98)
Space heating efficiency (main heating system 1)													
	93.4000	93.4000	93.4000	93.4000	93.4000	0.0000	0.0000	0.0000	0.0000	93.4000	93.4000	93.4000	(210)
Space heating fuel (main heating system)													
	795.6527	638.3560	549.5877	324.7490	144.1798	0.0000	0.0000	0.0000	0.0000	321.9640	575.7728	810.8363	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	210.3555	185.4367	194.6474	172.6425	167.1484	147.2149	141.0431	157.2300	158.9665	181.0150	191.4664	205.3260	(64)
Efficiency of water heater												80.3000	(216)
(217)m	87.9593	87.7807	87.3783	86.4556	84.5130	80.3000	80.3000	80.3000	80.3000	86.3203	87.5101	88.0381	(217)
Fuel for water heating, kWh/month													
	239.1511	211.2499	222.7640	199.6891	197.7783	183.3312	175.6452	195.8033	197.9657	209.7016	218.7935	233.2239	(219)
Water heating fuel used												2485.0968	(219)
Annual totals kWh/year													
Space heating fuel - main system												4161.0983	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												416.7463	(232)
Total delivered energy for all uses												7137.9414	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4161.0983	0.2160	898.7972	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2485.0968	0.2160	536.7809	(264)
Space and water heating			1435.5782	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	416.7463	0.5190	216.2913	(268)
Total CO2, kg/m2/year			1690.7945	(272)
Emissions per m2 for space and water heating			15.3047	(272a)
Fuel factor (mains gas)			1.0000	
Emissions per m2 for lighting			2.3059	(272b)
Emissions per m2 for pumps and fans			0.4150	(272c)
Target Carbon Dioxide Emission Rate (TER) = (15.3047 * 1.00) + 2.3059 + 0.4150, rounded to 2 d.p.			18.0300	(273)

FULL SAP CALCULATION PRINTOUT
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	19-104-00-P06	**Issued on Date**	13/12/2021
Assessment Reference	001	**Prop Type Ref**	Darvel Down
Property	Plot 06, Darvel Down, Netherfield, East Sussex, TN33		

SAP Rating	84 B	**DER**	17.88	**TER**	18.03
Environmental	86 B	**% DER<TER**	0.81		
CO_2 Emissions (t/year)	1.40	**DFEE**	46.89	**TFEE**	53.34
General Requirements Compliance	Pass	**% DFEE<TFEE**	12.10		

Assessor Details	Mr. Stuart Searle, SRS Surveyors Ltd (Consult Construct), Tel: 01227 767770, stuart.searle@consultconstruct.co.uk	**Assessor ID**	L603-0001
Client	Asprey Homes, Asprey Homes		

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	38.5400	(1b)	x 2.3900	(2b) =	92.1106	(1b) - (3b)
First floor	55.2600	(1c)	x 2.6000	(2c) =	143.6760	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.8000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	235.7866	(5)

2. Ventilation rate

	main heating		secondary heating		other		total		m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =		0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =		0.0000	(6b)
Number of intermittent fans							3 * 10 =		30.0000	(7a)
Number of passive vents							0 * 10 =		0.0000	(7b)
Number of flueless gas fires							0 * 40 =		0.0000	(7c)

			Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =		30.0000 / (5) =	0.1272	(8)
Pressure test			Yes	
Measured/design AP50			5.0000	
Infiltration rate			0.3772	(18)
Number of sides sheltered			2	(19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.3206	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4088	0.4008	0.3928	0.3527	0.3447	0.3046	0.3046	0.2966	0.3206	0.3447	0.3607	0.3768	(22b)
Effective ac	0.5836	0.5803	0.5771	0.5622	0.5594	0.5464	0.5464	0.5440	0.5514	0.5594	0.5651	0.5710	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Glazed Entrance Door			2.1000	1.6000	3.3600			(26a)
Windows - Double (Uw = 1.20)			12.9300	1.1450	14.8053			(27)
FT1 - Ground BB			38.5400	0.1000	3.8540			(28a)
FT3 - Over Car Port			16.7200	0.2000	3.3440			(28b)
EWT1 - Brick/Block	82.1000	13.3300	68.7700	0.1900	13.0663			(29a)
EWT2 - Clad/Block	7.4200	1.7000	5.7200	0.1800	1.0296			(29a)
RT1 - Ins Ceiling	55.2600		55.2600	0.0900	4.9734			(30)
Total net area of external elements Aum(A, m2)			200.0400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.4326			(33)
PWT1: Party Wall			56.5900	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	16.4429	(36)
Total fabric heat loss (33) + (36) =	60.8755	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.4073	45.1548	44.9073	43.7448	43.5273	42.5148	42.5148	42.3273	42.9048	43.5273	43.9673	44.4273	(38)

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Heat transfer coeff

	106.2829	106.0304	105.7829	104.6204	104.4029	103.3903	103.3903	103.2028	103.7803	104.4029	104.8429	105.3029 (39)
Average = Sum(39)m / 12 =												104.6193 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1331	1.1304	1.1277	1.1154	1.1130	1.1022	1.1022	1.1002	1.1064	1.1130	1.1177	1.1226	(40)
HLP (average)												1.1153	(40)
Days in month													
	31	28	31	30	31	30	31	31	30	31	30	31	(41)

---

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6742 (42)
Average daily hot water use (litres/day) 97.7133 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.4846	103.5761	99.6676	95.7590	91.8505	87.9420	87.9420	91.8505	95.7590	99.6676	103.5761	107.4846	(44)
Energy conte	159.3966	139.4093	143.8579	125.4188	120.3423	103.8463	96.2289	110.4240	111.7428	130.2255	142.1513	154.3671	(45)
Energy content (annual)										Total = Sum(45)m =		1537.4109	(45)
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Heat gains from water heating, kWh/month													
	33.8718	29.6245	30.5698	26.6515	25.5727	22.0673	20.4486	23.4651	23.7454	27.6729	30.2072	32.8030	(65)

---

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.5979	20.9594	17.0454	12.9044	9.6462	8.1437	8.7996	11.4381	15.3521	19.4931	22.7513	24.2538	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.8977	248.4494	242.0193	228.3304	211.0507	194.8102	183.9605	181.4089	187.8390	201.5278	218.8076	235.0481	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	(71)
Water heating gains (Table 5)													
	45.5266	44.0840	41.0885	37.0160	34.3720	30.6491	27.4847	31.5391	32.9797	37.1948	41.9544	44.0901	(72)
Total internal gains													
	378.1359	376.6065	363.2668	341.3645	318.1826	296.7167	283.3585	287.4997	299.2844	321.3293	346.6269	366.5056	(73)

---

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	7.8800	11.2829	0.6300	0.7000	0.7700	27.1719	(75)
Southwest	5.0500	36.7938	0.6300	0.7000	0.7700	56.7856	(79)

Solar gains	83.9575	152.0361	231.9956	327.6364	403.6569	416.8708	395.1941	336.0130	264.7273	174.4961	102.2054	70.7866	(83)
Total gains	462.0934	528.6427	595.2624	669.0009	721.8395	713.5874	678.5526	623.5127	564.0117	495.8254	448.8323	437.2922	(84)

---

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.2882	61.4342	61.5779	62.2622	62.3919	63.0029	63.0029	63.1173	62.7661	62.3919	62.1300	61.8586	
alpha	5.0859	5.0956	5.1052	5.1508	5.1595	5.2002	5.2002	5.2078	5.1844	5.1595	5.1420	5.1239	
util living area													
	0.9992	0.9982	0.9951	0.9820	0.9338	0.8055	0.6403	0.7075	0.9202	0.9904	0.9984	0.9994	(86)
MIT	19.6811	19.8149	20.0535	20.3864	20.7007	20.9122	20.9793	20.9661	20.8011	20.4005	19.9836	19.6596	(87)
Th 2	19.9739	19.9761	19.9782	19.9883	19.9902	19.9990	19.9990	20.0006	19.9956	19.9902	19.9864	19.9824	(88)
util rest of house													
	0.9989	0.9976	0.9932	0.9743	0.9033	0.7215	0.5096	0.5790	0.8704	0.9851	0.9977	0.9992	(89)
MIT 2	18.7644	18.8998	19.1393	19.4762	19.7750	19.9552	19.9933	19.9900	19.8736	19.4943	19.0767	18.7498	(90)
Living area fraction									fLA = Living area / (4) =			0.1966	(91)
MIT	18.9446	19.0797	19.3190	19.6551	19.9570	20.1433	20.1872	20.1819	20.0559	19.6725	19.2550	18.9286	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9446	19.0797	19.3190	19.6551	19.9570	20.1433	20.1872	20.1819	20.0559	19.6725	19.2550	18.9286	(93)

---

8. Space heating requirement

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9985	0.9968	0.9916	0.9710	0.9021	0.7351	0.5356	0.6044	0.8741	0.9828	0.9970	0.9989	(94)
Useful gains	461.4178	526.9729	590.2374	649.5748	651.1811	524.5690	363.4329	376.8349	493.0132	487.2908	447.4713	436.8137	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1556.4740	1503.4777	1356.0299	1125.2050	862.0547	573.1288	370.8774	390.2984	618.1052	947.1922	1274.3599	1550.9658	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	814.7217	656.2112	569.7496	342.4537	156.8900	0.0000	0.0000	0.0000	0.0000	342.1666	595.3598	828.9291	(98)
Space heating												4306.4818	(98)
Space heating per m2											(98) / (4) =	45.9113	(99)

8c. Space cooling requirement

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	971.8693	765.0886	784.3416	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8226	0.8961	0.8621	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	799.5042	685.5802	676.1522	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	936.2261	893.1715	830.8409	0.0000	0.0000	0.0000	0.0000	(103)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	(103a)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	98.4398	154.4479	115.0883	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												367.9760	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	24.6099	38.6120	28.7721	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling												91.9940	(107)
Space cooling per m2												0.9807	(108)
Energy for space heating												45.9113	(99)
Energy for space cooling												0.9807	(108)
Total												46.8921	(109)
Dwelling Fabric Energy Efficiency (DFEE)												46.9	(109)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	38.5400 (1b)	x	2.3900 (2b)	=	92.1106	(1b) - (3b)
First floor	55.2600 (1c)	x	2.6000 (2c)	=	143.6760	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.8000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	235.7866	(5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000	(6b)
Number of intermittent fans							3 * 10 =	30.0000	(7a)
Number of passive vents							0 * 10 =	0.0000	(7b)
Number of flueless gas fires							0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1272	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.3772	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3206	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4088	0.4008	0.3928	0.3527	0.3447	0.3046	0.3046	0.2966	0.3206	0.3447	0.3607	0.3768	(22b)
Effective ac	0.5836	0.5803	0.5771	0.5622	0.5594	0.5464	0.5464	0.5440	0.5514	0.5594	0.5651	0.5710	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Semi-glazed door			2.1000	1.2000	2.5200			(26a)
TER Opening Type (Uw = 1.40)			12.9300	1.3258	17.1420			(27)
FT1 - Ground BB			38.5400	0.1300	5.0102			(28a)
FT3 - Over Car Port			16.7200	0.1300	2.1736			(28b)
EWT1 - Brick/Block	82.1000	13.3300	68.7700	0.1800	12.3786			(29a)
EWT2 - Clad/Block	7.4200	1.7000	5.7200	0.1800	1.0296			(29a)
RT1 - Ins Ceiling	55.2600		55.2600	0.1300	7.1838			(30)
Total net area of external elements Aum(A, m2)			200.0400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		47.4378			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	12.6076	(36)
Total fabric heat loss (33) + (36) =	60.0454	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.4073	45.1548	44.9073	43.7448	43.5273	42.5148	42.5148	42.3273	42.9048	43.5273	43.9673	44.4273	(38)
Heat transfer coeff	105.4528	105.2003	104.9528	103.7903	103.5728	102.5603	102.5603	102.3727	102.9503	103.5728	104.0128	104.4728	(39)
Average = Sum(39)m / 12 =												103.7892	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1242	1.1215	1.1189	1.1065	1.1042	1.0934	1.0934	1.0914	1.0976	1.1042	1.1089	1.1138	(40)
HLP (average)												1.1065	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6742	(42)
Average daily hot water use (litres/day)	97.7133	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4846	103.5761	99.6676	95.7590	91.8505	87.9420	87.9420	91.8505	95.7590	99.6676	103.5761	107.4846	(44)
Energy conte	159.3966	139.4093	143.8579	125.4188	120.3423	103.8463	96.2289	110.4240	111.7428	130.2255	142.1513	154.3671	(45)
Energy content (annual)										Total = Sum(45)m =		1537.4109	(45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Heat gains from water heating, kWh/month													
	33.8718	29.6245	30.5698	26.6515	25.5727	22.0673	20.4486	23.4651	23.7454	27.6729	30.2072	32.8030	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	133.7122	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.5979	20.9594	17.0454	12.9044	9.6462	8.1437	8.7996	11.4381	15.3521	19.4931	22.7513	24.2538	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.8977	248.4494	242.0193	228.3304	211.0507	194.8102	183.9605	181.4089	187.8390	201.5278	218.8076	235.0481	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	36.3712	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	-106.9698	(71)
Water heating gains (Table 5)													
	45.5266	44.0840	41.0885	37.0160	34.3720	30.6491	27.4847	31.5391	32.9797	37.1948	41.9544	44.0901	(72)
Total internal gains													
	378.1359	376.6065	363.2668	341.3645	318.1826	296.7167	283.3585	287.4997	299.2844	321.3293	346.6269	366.5056	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	7.8800	11.2829	0.6300	0.7000	0.7700	27.1719	(75)
Southwest	5.0500	36.7938	0.6300	0.7000	0.7700	56.7856	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	83.9575	152.0361	231.9956	327.6364	403.6569	416.8708	395.1941	336.0130	264.7273	174.4961	102.2054	70.7866	(83)
Total gains	462.0934	528.6427	595.2624	669.0009	721.8395	713.5874	678.5526	623.5127	564.0117	495.8254	448.8323	437.2922	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.7707	61.9189	62.0650	62.7601	62.8919	63.5128	63.5128	63.6291	63.2722	62.8919	62.6259	62.3501	
alpha	5.1180	5.1279	5.1377	5.1840	5.1928	5.2342	5.2342	5.2419	5.2181	5.1928	5.1751	5.1567	
util living area													
	0.9992	0.9982	0.9951	0.9818	0.9327	0.8026	0.6365	0.7039	0.9189	0.9903	0.9984	0.9994	(86)
MIT	19.6929	19.8265	20.0641	20.3954	20.7072	20.9153	20.9804	20.9676	20.8058	20.4082	19.9936	19.6715	(87)
Th 2	19.9811	19.9833	19.9854	19.9955	19.9974	20.0062	20.0062	20.0079	20.0028	19.9974	19.9936	19.9896	(88)
util rest of house													
	0.9989	0.9976	0.9932	0.9740	0.9020	0.7186	0.5070	0.5762	0.8688	0.9850	0.9977	0.9992	(89)
MIT 2	18.7820	18.9171	19.1556	19.4909	19.7871	19.9641	20.0008	19.9977	19.8839	19.5078	19.0924	18.7674	(90)
Living area fraction										fLA = Living area / (4) =		0.1966	(91)
MIT	18.9611	19.0958	19.3342	19.6687	19.9680	20.1511	20.1934	20.1884	20.0651	19.6848	19.2696	18.9451	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9611	19.0958	19.3342	19.6687	19.9680	20.1511	20.1934	20.1884	20.0651	19.6848	19.2696	18.9451	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9985	0.9969	0.9915	0.9707	0.9009	0.7324	0.5327	0.6014	0.8727	0.9827	0.9970	0.9989	(94)
Useful gains	461.4229	526.9778	590.2249	649.4067	650.3342	522.6035	361.4857	374.9956	492.1859	487.2406	447.4757	436.8181	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1546.0497	1493.4062	1346.9833	1117.6889	856.3415	569.3224	368.5404	387.8251	614.1081	940.9385	1265.7919	1540.4650	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	806.9623	649.4399	563.0282	337.1632	153.2694	0.0000	0.0000	0.0000	0.0000	337.5512	589.1876	821.1133	(98)
Space heating												4257.7152	(98)
Space heating per m2											(98) / (4) =	45.3914	(99)

8c. Space cooling requirement

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	964.0664	758.9459	778.0329	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8270	0.8995	0.8660	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	797.3245	682.6807	673.8083	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	936.2261	893.1715	830.8409	0.0000	0.0000	0.0000	0.0000	(103)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	(103a)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	100.0091	156.6051	116.8322	0.0000	0.0000	0.0000	0.0000	(104)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Space cooling											373.4465	(104)
Cooled fraction									fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)												
0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000	(106)
Space cooling kWh												
0.0000	0.0000	0.0000	0.0000	0.0000	25.0023	39.1513	29.2081	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling											93.3616	(107)
Space cooling per m2											0.9953	(108)
Energy for space heating											45.3914	(99)
Energy for space cooling											0.9953	(108)
Total											46.3867	(109)
Target Fabric Energy Efficiency (TFEE)											53.3	(109)