

**Former St John's Ambulance Site,
Convent Lane, Emsworth**

SAP Calculation Summary

02 May 2013-05-02

Description:

The proposed dwelling at the former St John's Ambulance site in Convent lane has been analysed to demonstrate compliance with Building Regulations Approved Document Part L and to provide input to the Code for Sustainable Homes preassessment.

The Planning Application drawings have been used as the basis for the calculation. The calculation has been performed using IES software and associated JPA SAP module.

A summary of the input and output data is included with this report.

Performance Requirements:

The building is required to comply with the Building Regulations Approved Document Part L 2010. This requires the Dwelling Emission Rate (DER) to be less than or equal to the Target Emission Rate (TER) as defined by the Standard Assessment Procedure.

The SAP model generates a TER of 14.90kgCO₂/m²/annum

The SAP assessment produces a DER of 11.04kgCO₂/m²/annum.

This equates to a 26% reduction over the performance required by Part L 2010.

This performance has been achieved by optimising the thermal performance of the building, capturing winter sun, high efficiency gas heating with under floor heating, low energy lighting, heat recovery ventilation and a small PV array.

In addition to Part L, the development is required to achieve Code for Sustainable Homes Level 4. Refer to the preassessment for full details of the credits proposed and performance achieved. There are 2 specific energy related credits which come from the SAP calculation. Both have credits relating to performance and ENE 1 has a mandatory performance minimum for Code 4.

Ene 1 – Dwelling Emissions Rate

Criteria		
% Improvement 2010 DER/TER* ¹	Credits* ²	Mandatory Requirements
≥ 8%	1	Level 4
≥ 16%	2	
≥ 25%	3	
≥ 36%	4	
≥ 47%	5	
≥ 59%	6	
≥ 72%	7	
≥ 85%	8	
≥ 100%	9	Level 5
Zero Net CO ₂ Emissions	10	Level 6

Ene 2 – Fabric Energy Efficiency

Criteria			
Dwelling Type* ¹		Credits* ²	Mandatory Levels
Apartment Blocks, Mid-Terrace	End Terrace, Semi- Detached & Detached		
Fabric Energy Efficiency kWh/m ² /year			
≤ 48	≤ 60	3	Levels 5 & 6
≤ 45	≤ 55	4	
≤ 43	≤ 52	5* ³	
≤ 41	≤ 49	6	
≤ 39	≤ 46	7	
≤ 35	≤ 42	8	
≤ 32	≤ 38	9	

The development must exceed the following:

ENE1 credit requires the DER to be 25% better than the TER and the preassessment requires 3 credits

ENE 2 does not have a mandatory requirement for Code 4 but the preassessment requires a minimum of 3 credits.

The SAP calculation confirms the development will achieve:

- ENE 1 - 3 credits (SAP shows a 26% improvement)
- ENE2 - 9 credits (SAP shows a Fabric Energy Efficiency of 35.2 kWh/m²/year)

Input Data:

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2010 Edition
assessed by program JPA Designer version 5.04a1, printed on 02/05/2013 at 14:27:19

DWELLING AS DESIGNED

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate

TER = 14.90

Dwelling Carbon Dioxide Emission Rate

DER = 11.04

OK

2 Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.09 (max. 0.30)	0.09 (max. 0.70)	OK
Floor	0.25 (max. 0.25)	0.25 (max. 0.70)	OK
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	OK
Openings	1.47 (max. 2.00)	1.47 (max. 3.30)	OK

3 Design air permeability

Air permeability at 50 pascals:

2.00

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Boiler and underfloor heating, mains gas

Baxi 100 HE

Source of efficiency: from boiler database

Baxi 100 HE

Efficiency: 90.6% SEDBUK2009

Minimum: 88.0%

OK

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage

Calculated cylinder loss factor (kWh/day)

1.74

Permitted by Section 6.4

1.96

OK

Primary pipework insulated

Yes

OK

6 Controls

(Also refer to "The Domestic Heating Compliance Guide" by the DCLG)

Space heating controls

Time and temperature zone control

OK

Cylinderstat - Yes

OK

Independent timer for DHW - Yes

OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%
Minimum: 75.0%

OK

8 Mechanical ventilation

Specific fan power : 0.73 Efficiency : 91.00
Maximum : 1.5W/(litre/sec) and efficiency not less than 70%

OK

9 Summertime temperature

Overheating risk (Southern England):

Medium

OK

OK

Based on:

Thermal mass parameter : 4.73

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : North

Ventilation rate : 8.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, air-filled, low-E, En=0.2, hard coat U-value 1.47 W/m²K

Walls U-value 0.09 W/m²K

Design air permeability 2.0 m³/h.m²

Photovoltaic array

Photovoltaic Array 1kWpeak

Output Data:

TER Summary Results:

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	14732.68	0.194	2858.14	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	1291.56	0.422	545.04	(263)
Water heating	3879.44	0.194	752.61	(264)
Space and water heating			4155.79	(265)
Electricity for pumps and fans	175.00	0.422	73.85	(267)
Electricity for lighting	978.14	0.422	412.78	(268)
Electricity generated - PVs	0.00	0.529	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			4642.42	(272)
			kg/m²/year	
Emissions per m² for space and water heating			21.79	(272a)
Emissions per m² for lighting			2.13	(272b)
Target Carbon Dioxide Emission Rate (TER)			14.90	(273)
= [(21.7854 x 1.0000 x 1.0206) + (2.1261 x 1.2251)] x 0.6000				

DER Summary Results:

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	7309.95	0.198	1447.37	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.517	0.00	(263)
Water heating	2717.63	0.198	538.09	(264)
Space and water heating			1985.46	(265)
Electricity for pumps and fans	591.30	0.517	305.70	(267)
Electricity for lighting	575.38	0.517	297.47	(268)
Electricity generated - PVs	-843.20	0.529	-446.05	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			2142.58	(272)
			kg/m²/year	
Dwelling Carbon Dioxide Emission Rate (DER)			11.04	(273)

Space Heating Requirement for the Dwelling per m2:

Space heating requirement per m² (kWh/m²/year)	35.24	(99)
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