



SAP Report Submission for Building Regulations Compliance

Client: Derzis Construct Limited
DS/20/146

Project: 11, Slaithwaite Drive
Manchester, M11 4BA

Contact: Maurizio Assante
MGA Consultancy Limited
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Report Issue Date: 12/11/2020

EXCELLENCE
IN ENERGY
ASSESSMENT

PREDICTED ENERGY ASSESSMENT

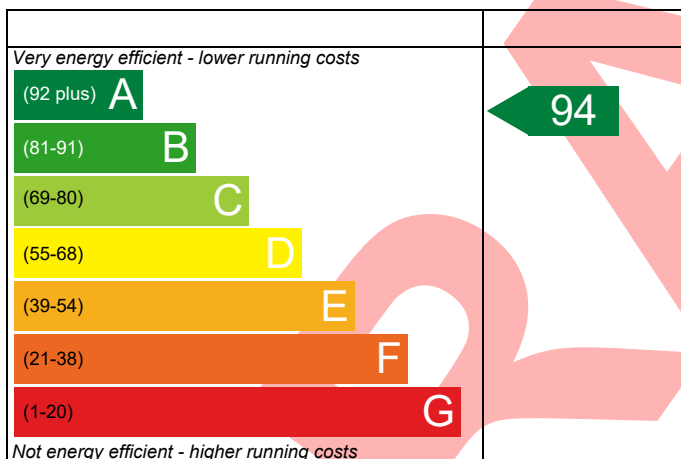
11, Slaithwaite Drive,
Manchester,
M11 4BA

Dwelling type: House, Detached
Date of assessment: 12/11/2020
Produced by: MGA Consultancy Limited
Total floor area: 100.4 m²

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 (CO₂) emissions.

Energy Efficiency Rating

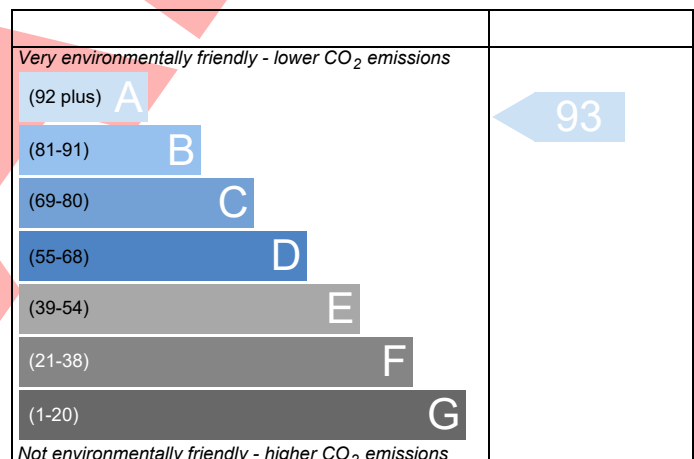


England

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 (CO₂) 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 (CO₂) emissions. The higher the rating the less impact it has on the environment.

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

THERMAL BRIDGING

Calculation Type: New Build (As Designed)

Property Reference	DS/20/146	Issued on Date	12/11/2020
Assessment Reference	DS/20/146	Prop Type Ref	New Dwelling
Property	11, Slaithwaite Drive, Manchester, M11 4BA		
SAP Rating	94 A	DER	9.72
Environmental	93 A	TER	18.66
CO ₂ Emissions (t/year)	0.74	% DER<TER	47.92
General Requirements Compliance	Pass	DFEE	58.94
		TFEE	59.68
		% DFEE<TFEE	1.24
Assessor Details	Mr. Maurizio Assante, MGA Consultancy Limited, Tel: 01404 811590, maurizio@mga-ltd.co.uk		Assessor ID
			5020-0001
Client	Derzis Construct Limited, 20/146		

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Table K1 - Approved	0.300	11.55	3.47	
External wall	E3 Sill	Table K1 - Approved	0.040	9.65	0.39	
External wall	E4 Jamb	Table K1 - Approved	0.050	37.00	1.85	
External wall	E5 Ground floor (normal)	Table K1 - Approved	0.160	27.00	4.32	
External wall	E6 Intermediate floor within a dwelling	Table K1 - Approved	0.070	46.14	3.23	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	9.00	0.54	
External wall	E12 Gable (insulation at ceiling level)	Table K1 - Approved	0.240	13.40	3.22	
External wall	E13 Gable (insulation at rafter level)	Table K1 - Approved	0.040	9.74	0.39	
External wall	E16 Corner (normal)	Table K1 - Approved	0.090	20.56	1.85	
External roof	R1 Head of roof window	Table K1 - Default	0.080	2.55	0.20	
External roof	R2 Sill of roof window	Table K1 - Default	0.060	2.55	0.15	
External roof	R3 Jamb of roof window	Table K1 - Default	0.080	7.20	0.58	
External roof	R6 Flat ceiling	Table K1 - Default	0.060	9.00	0.54	

Total: **20.72** W/mK:
Y-Value: **0.079** W/m²K:

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	DS/20/146			Issued on Date	12/11/2020
Assessment Reference	DS/20/146	Prop Type Ref	New Dwelling		
Property	11, Slaithwaite Drive, Manchester, M11 4BA				
SAP Rating	94 A	DER	9.72	TER	18.66
Environmental	93 A	% DER<TER	47.92		
CO ₂ Emissions (t/year)	0.74	DFEE	58.94	TFEE	59.68
General Requirements Compliance	Pass	% DFEE<TFEE	1.24		
Assessor Details	Mr. Maurizio Assante, MGA Consultancy Limited, Tel: 01404 811590, maurizio@mga-ltd.co.uk			Assessor ID	5020-0001
Client	Derzis Construct Limited, 20/146				

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

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

DWELLING AS DESIGNED

Detached House, total floor area 100 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) 18.66 kgCO₂/m²

Dwelling Carbon Dioxide Emission Rate (DER) 9.72 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)59.7 kWh/m²/yr

Dwelling Fabric Energy Efficiency (DFEE)58.9 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.28 (max. 0.70)	OK
Floor	0.13 (max. 0.25)	0.13 (max. 0.70)	OK
Roof	0.12 (max. 0.20)	0.13 (max. 0.35)	OK
Openings	1.64 (max. 2.00)	1.80 (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 manufacturer

SUITABLE MAKE SUITABLE MODEL

Combi boiler

Efficiency: 88%

Minimum: 88% OK

Secondary heating system: None

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

Space heating controls: Programmer, room thermostat and TRVs OK

Hot water controls: No cylinder

Boiler interlock Yes OK

7 Low energy lights

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

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (West Pennines (England)):Not significant OK

Based on:

Overshading:	Average
Windows facing North:	5.40 m ² , No overhang
Windows facing South:	4.64 m ² , No overhang
Windows facing West:	4.21 m ² , No overhang
Air change rate:	4.00 ach
Blinds/curtains:	None

10 Key features

Roof U-value	0.11 W/m ² K
Photovoltaic array	2.75 kW

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.5000 (1b)	x 2.4400 (2b)	= 98.8200 (1b) - (3b)
First floor	40.5000 (1c)	x 2.7000 (2c)	= 109.3500 (1c) - (3c)
Second floor	19.4000 (1d)	x 2.1900 (2d)	= 42.4860 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 250.6560 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					Air changes per hour 40.0000 / (5) = 0.1596 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4096 (18)
Number of sides sheltered					4 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2867 (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	0.3656	0.3584	0.3512	0.3154	0.3082	0.2724	0.2724	0.2652	0.2867	0.3082	0.3225	0.3369 (22b)
Effective ac	0.5668	0.5642	0.5617	0.5497	0.5475	0.5371	0.5371	0.5352	0.5411	0.5475	0.5520	0.5567 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Glazed Doors			3.7800	1.8000	6.8040		(26a)
Window/Double doors (Uw = 1.60)			14.2500	1.5038	21.4286		(27)
Roof Light (Uw = 1.60)			3.0600	1.5038	4.6015		(27a)
Ground Floor			40.5000	0.1300	5.2650		(28a)
Main Wall	155.9600	17.0400	138.9200	0.1800	25.0056		(29a)
Stud Wall	11.9900		11.9900	0.2456	2.9449		(29a)
Dormer	3.3400	0.9900	2.3500	0.2800	0.6580		(29a)
Traditional Roof	31.1900		31.1900	0.1100	3.4309		(30)
Sloped Roof	19.7600	3.0600	16.7000	0.1300	2.1710		(30)
Total net area of external elements Aum(A, m ²)			262.7400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		72.3095		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

250.0000 (35)
20.7198 (36)
(33) + (36) = 93.0293 (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	46.8848	46.6702	46.4599	45.4719	45.2870	44.4265	44.4265	44.2671	44.7579	45.2870	45.6610	46.0519 (38)
Heat transfer coeff	139.9141	139.6995	139.4892	138.5011	138.3163	137.4557	137.4557	137.2964	137.7872	138.3163	138.6902	139.0812 (39)
Average = Sum(39)m / 12 =												138.5003 (39)
HLP	1.3936	1.3914	1.3893	1.3795	1.3777	1.3691	1.3691	1.3675	1.3724	1.3777	1.3814	1.3853 (40)
HLP (average)												1.3795 (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												2.7432 (42)
Average daily hot water use (litres/day)												99.3510 (43)
Daily hot water use	109.2860	105.3120	101.3380	97.3639	93.3899	89.4159	89.4159	93.3899	97.3639	101.3380	105.3120	109.2860 (44)
Energy conte	162.0681	141.7458	146.2689	127.5208	122.3592	105.5867	97.8416	112.2747	113.6156	132.4080	144.5337	156.9543 (45)
Energy content (annual)										Total = Sum(45)m =		1563.1774 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Water storage loss:	24.3102	21.2619	21.9403	19.1281	18.3539	15.8380	14.6762	16.8412	17.0423	19.8612	21.6801	23.5431 (46)
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	50.9589	48.0151	47.5905	44.0955	45.5653	47.5905	48.0151	50.9589	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	213.0270	187.7732	197.2278	175.5359	169.9497	149.6822	143.4070	159.8651	161.6307	183.3669	193.8488	207.9132 (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)
Output from w/h	213.0270	187.7732	197.2278	175.5359	169.9497	149.6822	143.4070	159.8651	161.6307	183.3669	193.8488	207.9132 (64)
Heat gains from water heating, kWh/month	66.6274	58.6373	61.3741	54.4044	52.5821	46.1315	43.9237	49.2289	49.7810	56.7654	60.3862	64.9270 (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	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.2836	26.0095	21.1523	16.0137	11.9704	10.1059	10.9198	14.1940	19.0511	24.1898	28.2330	30.0975 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	256.9728	259.6394	252.9197	238.6143	220.5563	203.5843	192.2460	189.5794	196.2991	210.6045	228.6625	245.6345 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160 (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)	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279 (71)
Water heating gains (Table 5)	89.5529	87.2579	82.4921	75.5617	70.6748	64.0715	59.0372	66.1679	69.1402	76.2976	83.8698	87.2675 (72)
Total internal gains	442.9573	440.0547	423.7121	397.3377	370.3495	344.9097	329.3510	337.0893	351.6384	378.2398	407.9133	430.1475 (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			
North				5.4000	10.6334	0.6300	0.7000	0.7700	17.5484 (74)			
South				4.6400	46.7521	0.6300	0.7000	0.7700	66.2965 (78)			
West				4.2100	19.6403	0.6300	0.7000	0.7700	25.2698 (80)			
North				3.0600	16.1759	0.6300	0.7000	1.0000	19.6458 (82)			
Solar gains	128.7605	228.7519	344.3552	489.5918	613.2998	639.4183	603.6052	393.0093	260.6653	155.7883	109.2639 (83)	
Total gains	571.7178	668.8067	768.0673	886.9295	983.6493	984.3280	932.9561	842.4092	744.6477	638.9051	563.7016	539.4114 (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	49.8322	49.9087	49.9840	50.3405	50.4078	50.7234	50.7234	50.7823	50.6014	50.4078	50.2719	50.1306
alpha	4.3221	4.3272	4.3323	4.3560	4.3605	4.3816	4.3816	4.3855	4.3734	4.3605	4.3515	4.3420
util living area	0.9983	0.9963	0.9906	0.9695	0.9042	0.7658	0.6105	0.6824	0.8981	0.9836	0.9966	0.9987 (86)
MIT	19.4184	19.5818	19.8690	20.2674	20.6435	20.8867	20.9683	20.9490	20.7465	20.2724	19.7739	19.3873 (87)
Th 2	19.7683	19.7699	19.7715	19.7791	19.7805	19.7871	19.7871	19.7883	19.7846	19.7805	19.7776	19.7746 (88)
util rest of house	0.9977	0.9950	0.9869	0.9566	0.8614	0.6653	0.4603	0.5332	0.8339	0.9745	0.9952	0.9982 (89)
MIT 2	18.3407	18.5048	18.7916	19.1880	19.5377	19.7349	19.7794	19.7739	19.6386	19.1992	18.7030	18.3146 (90)
Living area fraction									fLA = Living area / (4) =			0.1927 (91)
MIT	18.5484	18.7124	18.9993	19.3960	19.7508	19.9569	20.0085	20.0004	19.8522	19.4061	18.9094	18.5214 (92)
Temperature adjustment												0.0000
adjusted MIT	18.5484	18.7124	18.9993	19.3960	19.7508	19.9569	20.0085	20.0004	19.8522	19.4061	18.9094	18.5214 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	569.8709	664.3319	755.5849	843.6769	846.0927	670.5340	456.8260	473.4147	624.2821	620.0888	560.1241	538.0569 (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	1993.5510	1929.5847	1743.5147	1453.7068	1113.5604	736.3318	468.5187	494.3165	792.5747	1218.0205	1637.8444	1991.8341 (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	1059.2180	850.2499	735.0198	439.2215	198.9959	0.0000	0.0000	0.0000	0.0000	444.8612	775.9586	1081.6102 (98)
Space heating												5585.1351 (98)
Space heating per m2												(98) / (4) = 55.6288 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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 %)													88.4000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													6318.0262 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1059.2180	850.2499	735.0198	439.2215	198.9959	0.0000	0.0000	0.0000	0.0000	444.8612	775.9586	1081.6102	(98)
Space heating efficiency (main heating system 1)	88.4000	88.4000	88.4000	88.4000	88.4000	0.0000	0.0000	0.0000	0.0000	88.4000	88.4000	88.4000	(210)
Space heating fuel (main heating system)	1198.2104	961.8212	831.4703	496.8569	225.1085	0.0000	0.0000	0.0000	0.0000	503.2366	877.7812	1223.5410	(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 requirement	213.0270	187.7732	197.2278	175.5359	169.9497	149.6822	143.4070	159.8651	161.6307	183.3669	193.8488	207.9132	(64)
Efficiency of water heater (217)m	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	88.4000	(216)
Fuel for water heating, kWh/month	240.9807	212.4131	223.1084	198.5700	192.2508	169.3238	162.2251	180.8429	182.8401	207.4287	219.2860	235.1959	(219)
Water heating fuel used												2424.4654	(219)
Annual totals kWh/year													
Space heating fuel - main system												6318.0262	(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)												517.1583	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.75 * 1068 * 1.00) =										-2349.7551		-2349.7551	(233)
Total delivered energy for all uses												6984.8948	(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	6318.0262	0.2160	1364.6937 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2424.4654	0.2160	523.6845 (264)
Space and water heating			1888.3782 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	517.1583	0.5190	268.4052 (268)
Energy saving/generation technologies			
PV Unit	-2349.7551	0.5190	-1219.5229 (269)
Total CO2, kg/year			976.1855 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			9.7200 (273)

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

DER		9.7200 ZC1
Total Floor Area	TFA	100.4000
Assumed number of occupants	N	2.7432
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190
CO2 emissions from appliances, equation (L14)		15.1670 ZC2
CO2 emissions from cooking, equation (L16)		1.8410 ZC3
Total CO2 emissions		26.7280 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		26.7280 ZC8

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.5000 (1b)	x 2.4400 (2b)	= 98.8200 (1b) - (3b)
First floor	40.5000 (1c)	x 2.7000 (2c)	= 109.3500 (1c) - (3c)
Second floor	19.4000 (1d)	x 2.1900 (2d)	= 42.4860 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 250.6560 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					Air changes per hour 40.0000 / (5) = 0.1596 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4096 (18)
Number of sides sheltered					4 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2867 (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	0.3656	0.3584	0.3512	0.3154	0.3082	0.2724	0.2724	0.2652	0.2867	0.3082	0.3225	0.3369 (22b)
Effective ac	0.5668	0.5642	0.5617	0.5497	0.5475	0.5371	0.5371	0.5352	0.5411	0.5475	0.5520	0.5567 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
TER Semi-glazed door			3.7800	1.2000	4.5360		(26a)
TER Opening Type (Uw = 1.40)			14.2500	1.3258	18.8920		(27)
TER Room Window (Uw = 1.70)			3.0600	1.5918	4.8708		(27a)
Ground Floor			40.5000	0.1300	5.2650		(28a)
Main Wall	155.9600	17.0400	138.9200	0.1800	25.0056		(29a)
Stud Wall	11.9900		11.9900	0.1800	2.1582		(29a)
Dormer	3.3400	0.9900	2.3500	0.1800	0.4230		(29a)
Traditional Roof	31.1900		31.1900	0.1300	4.0547		(30)
Sloped Roof	19.7600	3.0600	16.7000	0.1300	2.1710		(30)
Total net area of external elements Aum(A, m ²)			262.7400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		67.3763		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

250.0000 (35)
12.6766 (36)
(33) + (36) = 80.0529 (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	46.8848	46.6702	46.4599	45.4719	45.2870	44.4265	44.4265	44.2671	44.7579	45.2870	45.6610	46.0519 (38)
Heat transfer coeff	126.9378	126.7232	126.5128	125.5248	125.3399	124.4794	124.4794	124.3200	124.8109	125.3399	125.7139	126.1049 (39)
Average = Sum(39)m / 12 =												125.5239 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2643	1.2622	1.2601	1.2502	1.2484	1.2398	1.2398	1.2382	1.2431	1.2484	1.2521	1.2560 (40)
HLP (average)												1.2502 (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												2.7432 (42)
Average daily hot water use (litres/day)												99.3510 (43)
Daily hot water use	109.2860	105.3120	101.3380	97.3639	93.3899	89.4159	89.4159	93.3899	97.3639	101.3380	105.3120	109.2860 (44)
Energy conte	162.0681	141.7458	146.2689	127.5208	122.3592	105.5867	97.8416	112.2747	113.6156	132.4080	144.5337	156.9543 (45)
Energy content (annual)										Total = Sum(45)m =		1563.1774 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

	24.3102	21.2619	21.9403	19.1281	18.3539	15.8380	14.6762	16.8412	17.0423	19.8612	21.6801	23.5431 (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	50.9589	48.0151	47.5905	44.0955	45.5653	47.5905	48.0151	50.9589	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	213.0270	187.7732	197.2278	175.5359	169.9497	149.6822	143.4070	159.8651	161.6307	183.3669	193.8488	207.9132 (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)
Output from w/h	213.0270	187.7732	197.2278	175.5359	169.9497	149.6822	143.4070	159.8651	161.6307	183.3669	193.8488	207.9132 (64)
Heat gains from water heating, kWh/month	66.6274	58.6373	61.3741	54.4044	52.5821	46.1315	43.9237	49.2289	49.7810	56.7654	60.3862	64.9270 (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	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.4269	20.8076	16.9219	12.8109	9.5763	8.0847	8.7358	11.3552	15.2409	19.3518	22.5864	24.0780 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	256.9728	259.6394	252.9197	238.6143	220.5563	203.5843	192.2460	189.5794	196.2991	210.6045	228.6625	245.6345 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160 (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)	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279 (71)
Water heating gains (Table 5)	89.5529	87.2579	82.4921	75.5617	70.6748	64.0715	59.0372	66.1679	69.1402	76.2976	83.8698	87.2675 (72)
Total internal gains	437.1006	434.8528	419.4817	394.1349	367.9554	342.8885	327.1670	334.2505	347.8282	373.4019	402.2667	424.1280 (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	
North					5.4000	10.6334	0.6300	0.7000	0.7700		17.5484 (74)	
South					4.6400	46.7521	0.6300	0.7000	0.7700		66.2965 (78)	
West					4.2100	19.6403	0.6300	0.7000	0.7700		25.2698 (80)	
North					3.0600	16.1759	0.6300	0.7000	1.0000		19.6458 (82)	
Solar gains	128.7605	228.7519	344.3552	489.5918	613.2998	639.4183	603.6052	505.3199	393.0093	260.6653	155.7883	109.2639 (83)
Total gains	565.8611	663.6048	763.8369	883.7267	981.2552	982.3068	930.7722	839.5704	740.8375	634.0672	558.0550	533.3919 (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	54.9263	55.0193	55.1108	55.5446	55.6265	56.0111	56.0111	56.0829	55.8623	55.6265	55.4610	55.2891
alpha	4.6618	4.6680	4.6741	4.7030	4.7084	4.7341	4.7341	4.7389	4.7242	4.7084	4.6974	4.6859
util living area	0.9984	0.9964	0.9902	0.9657	0.8876	0.7297	0.5678	0.6416	0.8812	0.9825	0.9968	0.9988 (86)
MIT	19.5752	19.7359	20.0114	20.3887	20.7292	20.9265	20.9823	20.9694	20.8083	20.3746	19.9061	19.5447 (87)
Th 2	19.8689	19.8706	19.8722	19.8800	19.8815	19.8883	19.8883	19.8895	19.8856	19.8815	19.8785	19.8754 (88)
util rest of house	0.9979	0.9952	0.9865	0.9518	0.8425	0.6332	0.4347	0.5055	0.8146	0.9730	0.9954	0.9984 (89)
MIT 2	17.9744	18.2101	18.6121	19.1573	19.6139	19.8393	19.8819	19.8769	19.7258	19.1461	18.4650	17.9343 (90)
Living area fraction									fLA = Living area / (4) =			0.1927 (91)
MIT	18.2829	18.5042	18.8818	19.3946	19.8289	20.0489	20.0940	20.0874	19.9344	19.3829	18.7427	18.2447 (92)
Temperature adjustment												0.0000
adjusted MIT	18.2829	18.5042	18.8818	19.3946	19.8289	20.0489	20.0940	20.0874	19.9344	19.3829	18.7427	18.2447 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9967	0.9928	0.9818	0.9439	0.8400	0.6484	0.4604	0.5315	0.8181	0.9670	0.9933	0.9975 (94)
Useful gains	563.9896	658.8475	749.9655	834.1420	824.2219	636.9703	428.5259	446.2131	606.0995	613.1521	554.3150	532.0442 (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	1774.9564	1723.9646	1566.4520	1317.3367	1018.8742	678.2703	434.9265	458.4215	728.2012	1100.8429	1463.6537	1771.1011 (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	900.9594	715.7587	607.4659	347.9002	144.8213	0.0000	0.0000	0.0000	0.0000	362.8420	654.7239	921.8584 (98)
Space heating												4656.3297 (98)
Space heating per m2												(98) / (4) = 46.3778 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 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 %)													93.4000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													4985.3637 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	900.9594	715.7587	607.4659	347.9002	144.8213	0.0000	0.0000	0.0000	0.0000	362.8420	654.7239	921.8584	(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)	964.6246	766.3369	650.3918	372.4841	155.0549	0.0000	0.0000	0.0000	0.0000	388.4818	700.9892	987.0004	(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 requirement	213.0270	187.7732	197.2278	175.5359	169.9497	149.6822	143.4070	159.8651	161.6307	183.3669	193.8488	207.9132	(64)
Efficiency of water heater (217)m	88.2767	88.0972	87.6965	86.7412	84.6514	80.3000	80.3000	80.3000	80.3000	86.7375	87.8751	88.3548	(216)
Fuel for water heating, kWh/month	241.3172	213.1432	224.8982	202.3673	200.7643	186.4037	178.5890	199.0849	201.2835	211.4044	220.5958	235.3161	(219)
Water heating fuel used												2515.1676	(219)
Annual totals kWh/year													
Space heating fuel - main system												4985.3637	(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)												413.7267	(232)
Total delivered energy for all uses												7989.2580	(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	4985.3637	0.2160	1076.8386 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2515.1676	0.2160	543.2762 (264)
Space and water heating			1620.1148 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	413.7267	0.5190	214.7241 (268)
Total CO2, kg/m2/year			1873.7639 (272)
Emissions per m2 for space and water heating			16.1366 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.1387 (272b)
Emissions per m2 for pumps and fans			0.3877 (272c)
Target Carbon Dioxide Emission Rate (TER) = (16.1366 * 1.00) + 2.1387 + 0.3877, rounded to 2 d.p.			18.6600 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.5000 (1b)	x 2.4400 (2b)	= 98.8200 (1b) - (3b)
First floor	40.5000 (1c)	x 2.7000 (2c)	= 109.3500 (1c) - (3c)
Second floor	19.4000 (1d)	x 2.1900 (2d)	= 42.4860 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 250.6560 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					Air changes per hour 40.0000 / (5) = 0.1596 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4096 (18)
Number of sides sheltered					4 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2867 (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	0.3656	0.3584	0.3512	0.3154	0.3082	0.2724	0.2724	0.2652	0.2867	0.3082	0.3225	0.3369 (22b)
Effective ac	0.5668	0.5642	0.5617	0.5497	0.5475	0.5371	0.5371	0.5352	0.5411	0.5475	0.5520	0.5567 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Glazed Doors			3.7800	1.8000	6.8040		(26a)
Window/Double doors (Uw = 1.60)			14.2500	1.5038	21.4286		(27)
Roof Light (Uw = 1.60)			3.0600	1.5038	4.6015		(27a)
Ground Floor			40.5000	0.1300	5.2650		(28a)
Main Wall	155.9600	17.0400	138.9200	0.1800	25.0056		(29a)
Stud Wall	11.9900		11.9900	0.2456	2.9449		(29a)
Dormer	3.3400	0.9900	2.3500	0.2800	0.6580		(29a)
Traditional Roof	31.1900		31.1900	0.1100	3.4309		(30)
Sloped Roof	19.7600	3.0600	16.7000	0.1300	2.1710		(30)
Total net area of external elements Aum(A, m ²)			262.7400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		72.3095		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

250.0000 (35)
20.7198 (36)
(33) + (36) = 93.0293 (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	46.8848	46.6702	46.4599	45.4719	45.2870	44.4265	44.4265	44.2671	44.7579	45.2870	45.6610	46.0519 (38)
Heat transfer coeff	139.9141	139.6995	139.4892	138.5011	138.3163	137.4557	137.4557	137.2964	137.7872	138.3163	138.6902	139.0812 (39)
Average = Sum(39)m / 12 =												138.5003 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3936	1.3914	1.3893	1.3795	1.3777	1.3691	1.3691	1.3675	1.3724	1.3777	1.3814	1.3853 (40)
HLP (average)												1.3795 (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												2.7432 (42)
Average daily hot water use (litres/day)												99.3510 (43)
Daily hot water use	109.2860	105.3120	101.3380	97.3639	93.3899	89.4159	89.4159	93.3899	97.3639	101.3380	105.3120	109.2860 (44)
Energy conte	162.0681	141.7458	146.2689	127.5208	122.3592	105.5867	97.8416	112.2747	113.6156	132.4080	144.5337	156.9543 (45)
Energy content (annual)												Total = Sum(45)m = 1563.1774 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Water 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 (46)
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	34.4395	30.1210	31.0821	27.0982	26.0013	22.4372	20.7913	23.8584	24.1433	28.1367	30.7134	33.3528 (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	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.4269	20.8076	16.9219	12.8109	9.5763	8.0847	8.7358	11.3552	15.2409	19.3518	22.5864	24.0780	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	256.9728	259.6394	252.9197	238.6143	220.5563	203.5843	192.2460	189.5794	196.2991	210.6045	228.6625	245.6345	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	(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)	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	(71)
Water heating gains (Table 5)	46.2896	44.8229	41.7771	37.6363	34.9480	31.1627	27.9454	32.0677	33.5324	37.8182	42.6575	44.8290	(72)
Total internal gains	390.8373	389.4178	375.7666	353.2096	329.2286	306.9798	293.0752	297.1503	309.2204	331.9225	358.0544	378.6895	(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				
North				5.4000	10.6334	0.6300	0.7000	0.7700	17.5484 (74)				
South				4.6400	46.7521	0.6300	0.7000	0.7700	66.2965 (78)				
West				4.2100	19.6403	0.6300	0.7000	0.7700	25.2698 (80)				
North				3.0600	16.1759	0.6300	0.7000	1.0000	19.6458 (82)				
Solar gains	128.7605	228.7519	344.3552	489.5918	613.2998	639.4183	603.6052	505.3199	393.0093	260.6653	155.7883	109.2639	(83)
Total gains	519.5978	618.1697	720.1218	842.8013	942.5284	946.3981	896.6803	802.4702	702.2296	592.5878	513.8428	487.9534	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	49.8322	49.9087	49.9840	50.3405	50.4078	50.7234	50.7234	50.7823	50.6014	50.4078	50.2719	50.1306	
alpha	4.3221	4.3272	4.3323	4.3560	4.3605	4.3816	4.3816	4.3855	4.3734	4.3605	4.3515	4.3420	
util living area	0.9988	0.9973	0.9926	0.9745	0.9151	0.7833	0.6301	0.7061	0.9136	0.9876	0.9977	0.9991	(86)
MIT	19.3720	19.5371	19.8278	20.2327	20.6193	20.8755	20.9642	20.9416	20.7220	20.2336	19.7298	19.3414	(87)
Th 2	19.7683	19.7699	19.7715	19.7791	19.7805	19.7871	19.7871	19.7883	19.7846	19.7805	19.7776	19.7746	(88)
util rest of house	0.9984	0.9963	0.9897	0.9633	0.8756	0.6847	0.4775	0.5562	0.8554	0.9805	0.9966	0.9988	(89)
MIT 2	18.2945	18.4604	18.7510	19.1551	19.5179	19.7286	19.7782	19.7713	19.6205	19.1618	18.6591	18.2688	(90)
Living area fraction	18.5021	18.6679	18.9585	19.3628	19.7301	19.9497	20.0068	19.9969	19.8328	19.3684	18.8655	18.4755	(91)
Temperature adjustment	18.5021	18.6679	18.9585	19.3628	19.7301	19.9497	20.0068	19.9969	19.8328	19.3684	18.8655	18.4755	(92)
adjusted MIT	18.5021	18.6679	18.9585	19.3628	19.7301	19.9497	20.0068	19.9969	19.8328	19.3684	18.8655	18.4755	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9978	0.9950	0.9870	0.9582	0.8736	0.6998	0.5073	0.5850	0.8584	0.9770	0.9955	0.9983	(94)
Ext temp.	518.4323	615.0751	710.7577	807.6035	823.3519	662.2644	454.8850	469.4625	602.7938	578.9529	511.5317	487.1221	(95)
Heat loss rate W	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)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	(97)
Space heating kWh	1987.0797	1923.3743	1737.8309	1449.1123	1110.7001	735.3431	468.2789	493.8381	789.9017	1212.8127	1631.7544	1985.4600	(98)
Space heating per m2	1092.6736	879.1771	764.1425	461.8863	213.7870	0.0000	0.0000	0.0000	0.0000	471.5917	806.5603	1114.7634	(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	1292.0840	1017.1725	1043.4525	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7746	0.8511	0.8049	0.0000	0.0000	0.0000	0.0000	(101)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1000.8128	865.7535	839.9124	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1177.6166	1119.9986	1019.9824	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	127.2987	189.1583	133.9721	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												450.4291 (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	31.8247	47.2896	33.4930	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												112.6073 (107)
Space cooling per m2												1.1216 (108)
Energy for space heating												57.8146 (99)
Energy for space cooling												1.1216 (108)
Total												58.9361 (109)
Dwelling Fabric Energy Efficiency (DFEE)												58.9 (109)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.5000 (1b)	x 2.4400 (2b)	= 98.8200 (1b) - (3b)
First floor	40.5000 (1c)	x 2.7000 (2c)	= 109.3500 (1c) - (3c)
Second floor	19.4000 (1d)	x 2.1900 (2d)	= 42.4860 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 250.6560 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					Air changes per hour 40.0000 / (5) = 0.1596 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.4096 (18)
Number of sides sheltered					4 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2867 (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	0.3656	0.3584	0.3512	0.3154	0.3082	0.2724	0.2724	0.2652	0.2867	0.3082	0.3225	0.3369 (22b)
Effective ac	0.5668	0.5642	0.5617	0.5497	0.5475	0.5371	0.5371	0.5352	0.5411	0.5475	0.5520	0.5567 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
TER Semi-glazed door			3.7800	1.2000	4.5360		(26a)
TER Opening Type (Uw = 1.40)			14.2500	1.3258	18.8920		(27)
TER Room Window (Uw = 1.70)			3.0600	1.5918	4.8708		(27a)
Ground Floor			40.5000	0.1300	5.2650		(28a)
Main Wall	155.9600	17.0400	138.9200	0.1800	25.0056		(29a)
Stud Wall	11.9900		11.9900	0.1800	2.1582		(29a)
Dormer	3.3400	0.9900	2.3500	0.1800	0.4230		(29a)
Traditional Roof	31.1900		31.1900	0.1300	4.0547		(30)
Sloped Roof	19.7600	3.0600	16.7000	0.1300	2.1710		(30)
Total net area of external elements Aum(A, m ²)			262.7400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	67.3763		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

250.0000 (35)
12.6766 (36)
(33) + (36) = 80.0529 (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	46.8848	46.6702	46.4599	45.4719	45.2870	44.4265	44.4265	44.2671	44.7579	45.2870	45.6610	46.0519 (38)
Heat transfer coeff	126.9378	126.7232	126.5128	125.5248	125.3399	124.4794	124.4794	124.3200	124.8109	125.3399	125.7139	126.1049 (39)
Average = Sum(39)m / 12 =												125.5239 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2643	1.2622	1.2601	1.2502	1.2484	1.2398	1.2398	1.2382	1.2431	1.2484	1.2521	1.2560 (40)
HLP (average)												1.2502 (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 2.7432 (42)
Average daily hot water use (litres/day) 99.3510 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	109.2860	105.3120	101.3380	97.3639	93.3899	89.4159	89.4159	93.3899	97.3639	101.3380	105.3120	109.2860 (44)
Energy conte	162.0681	141.7458	146.2689	127.5208	122.3592	105.5867	97.8416	112.2747	113.6156	132.4080	144.5337	156.9543 (45)
Energy content (annual)										Total = Sum(45)m =		1563.1774 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Water 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 (46)
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	34.4395	30.1210	31.0821	27.0982	26.0013	22.4372	20.7913	23.8584	24.1433	28.1367	30.7134	33.3528 (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	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	137.1599	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.4269	20.8076	16.9219	12.8109	9.5763	8.0847	8.7358	11.3552	15.2409	19.3518	22.5864	24.0780	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	256.9728	259.6394	252.9197	238.6143	220.5563	203.5843	192.2460	189.5794	196.2991	210.6045	228.6625	245.6345	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	36.7160	(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)	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	-109.7279	(71)
Water heating gains (Table 5)	46.2896	44.8229	41.7771	37.6363	34.9480	31.1627	27.9454	32.0677	33.5324	37.8182	42.6575	44.8290	(72)
Total internal gains	390.8373	389.4178	375.7666	353.2096	329.2286	306.9798	293.0752	297.1503	309.2204	331.9225	358.0544	378.6895	(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	
North				5.4000	10.6334		0.6300		0.7000	0.7700	17.5484 (74)	
South				4.6400	46.7521		0.6300		0.7000	0.7700	66.2965 (78)	
West				4.2100	19.6403		0.6300		0.7000	0.7700	25.2698 (80)	
North				3.0600	16.1759		0.6300		0.7000	1.0000	19.6458 (82)	
Solar gains	128.7605	228.7519	344.3552	489.5918	613.2998	639.4183	603.6052	505.3199	393.0093	260.6653	155.7883	109.2639 (83)
Total gains	519.5978	618.1697	720.1218	842.8013	942.5284	946.3981	896.6803	802.4702	702.2296	592.5878	513.8428	487.9534 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	54.9263	55.0193	55.1108	55.5446	55.6265	56.0111	56.0111	56.0829	55.8623	55.6265	55.4610	55.2891	
alpha	4.6618	4.6680	4.6741	4.7030	4.7084	4.7341	4.7341	4.7389	4.7242	4.7084	4.6974	4.6859	
util living area	0.9989	0.9974	0.9923	0.9711	0.8998	0.7479	0.5863	0.6647	0.8978	0.9865	0.9977	0.9992	(86)
MIT	19.5331	19.6949	19.9730	20.3566	20.7082	20.9182	20.9798	20.9645	20.7878	20.3393	19.8661	19.5032	(87)
Th 2	19.8689	19.8706	19.8722	19.8800	19.8815	19.8883	19.8883	19.8895	19.8856	19.8815	19.8785	19.8754	(88)
util rest of house	0.9985	0.9964	0.9893	0.9591	0.8577	0.6522	0.4504	0.5267	0.8366	0.9791	0.9968	0.9989	(89)
MIT 2	18.5334	18.6961	18.9742	19.3564	19.6820	19.8505	19.8832	19.8793	19.7618	19.3456	18.8736	18.5087	(90)
Living area fraction	18.7261	18.8886	19.1667	19.5492	19.8798	20.0563	20.0946	20.0884	19.9596	19.5371	19.0649	18.7004	(91)
Temperature adjustment	18.7261	18.8886	19.1667	19.5492	19.8798	20.0563	20.0946	20.0884	19.9596	19.5371	19.0649	18.7004	(92)
adjusted MIT	18.7261	18.8886	19.1667	19.5492	19.8798	20.0563	20.0946	20.0884	19.9596	19.5371	19.0649	18.7004	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9980	0.9952	0.9868	0.9545	0.8576	0.6681	0.4769	0.5534	0.8416	0.9759	0.9958	0.9985	(94)
Ext temp.	518.5488	615.2166	710.5894	804.4556	808.3370	632.3260	427.5880	444.1084	591.0162	578.2878	511.6595	487.2200	(95)
Heat loss rate W	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)
Month fracti	1831.2117	1772.6835	1602.4959	1336.7373	1025.2533	679.1918	434.9996	458.5469	731.3368	1120.1767	1504.1555	1828.5679	(97)
Space heating kWh	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 per m2	976.6212	777.8178	663.5784	383.2428	161.3857	0.0000	0.0000	0.0000	0.0000	403.1653	714.5971	997.9629	(98)
												5078.3713	(98)
												50.5814	(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	1170.1062	921.1474	944.8322	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8282	0.8956	0.8558	0.0000	0.0000	0.0000	0.0000	(101)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	969.1222	824.9584	808.5638	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1177.6166	1119.9986	1019.9824	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	150.1160	219.5099	157.2954	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												526.9212 (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	37.5290	54.8775	39.3238	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												131.7303 (107)
Space cooling per m2												1.3121 (108)
Energy for space heating												50.5814 (99)
Energy for space cooling												1.3121 (108)
Total												51.8934 (109)
Target Fabric Energy Efficiency (TFEE)												59.7 (109)

ASSESSMENT NOTES

Calculation Type: New Build (As Designed)

Property Reference	DS/20/146		Issued on Date	12/11/2020
Assessment Reference	DS/20/146	Prop Type Ref	New Dwelling	
Property	11, Slaithwaite Drive, Manchester, M11 4BA			

SAP Rating	94 A	DER	9.72	TER	18.66
Environmental	93 A	% DER<TER	47.92		
CO ₂ Emissions (t/year)	0.74	DFEE	58.94	TFEE	59.68
General Requirements Compliance	Pass	% DFEE<TFEE	1.24		

Assessor Details	Mr. Maurizio Assante, MGA Consultancy Limited, Tel: 01404 811590, maurizio@mga-ltd.co.uk	Assessor ID	5020-0001
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Client	Derzis Construct Limited, 20/146
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ASSESSMENT NOTES - Last time updated on: 12.11.2020

Checked Google maps for terrain/sheltered sides

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	DS/20/146	Issued on Date	12/11/2020
Assessment Reference	DS/20/146	Prop Type Ref	New Dwelling
Property	11, Slaithwaite Drive, Manchester, M11 4BA		
SAP Rating	94 A	DER	9.72
Environmental	93 A	TER	18.66
CO ₂ Emissions (t/year)	0.74	% DER<TER	47.92
General Requirements Compliance	Pass	DFEE	58.94
		TFEE	59.68
		% DFEE<TFEE	1.24
Assessor Details	Mr. Maurizio Assante, MGA Consultancy Limited, Tel: 01404 811590, maurizio@mga-ltd.co.uk		Assessor ID
			5020-0001
Client	Derzis Construct Limited, 20/146		

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.66	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	9.72	kgCO ₂ /m ²	Pass
	-8.94 (-47.9%)	kgCO ₂ /m ²	

1b TFE and DFEE

Target Fabric Energy Efficiency (TFEE)	59.68	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	58.94	kWh/m ² /yr	
	-0.8 (-1.3%)	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)	0.28 (max. 0.70)	Pass
Floor	0.13 (max. 0.25)	0.13 (max. 0.70)	Pass
Roof	0.12 (max. 0.20)	0.13 (max. 0.35)	Pass
Openings	1.64 (max. 2.00)	1.80 (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)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from manufacturer SUITABLE MAKE SUITABLE MODEL Combi boiler Efficiency: 88% Minimum: 88%	Pass
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

75

%

Minimum

75

%

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))

Not significant

Pass

Based on:

Overshading

Average

Windows facing North

5.40 m², No overhang

Windows facing South

4.64 m², No overhang

Windows facing West

4.21 m², No overhang

Air change rate

4.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

Pass

10 Key features

Roof U-value

0.11

W/m²K

Photovoltaic array

2.75

kW

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	DS/20/146	Issued on Date	12/11/2020
Assessment Reference	DS/20/146	Prop Type Ref	New Dwelling
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General Requirements Compliance	Pass	% DFEE<TFEE	1.24		

Assessor Details	Mr. Maurizio Assante, MGA Consultancy Limited, Tel: 01404 811590, maurizio@mga-ltd.co.uk	Assessor ID	5020-0001
Client	Derzis Construct Limited, 20/146		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
3.0 Date Built	2020
4.0 Sheltered Sides	4
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	27.00 m	40.50 m ²	2.44 m
	1st Storey:	27.00 m	40.50 m ²	2.70 m
	2nd Storey:	19.14 m	19.40 m ²	2.19 m

7.0 Living Area	19.35	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Medium	
Thermal Mass	250.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
Main Wall	Cavity Wall	0.18	155.96	138.92
Stud Wall	Timber Frame	0.28	11.99	11.99
Dormer	Timber Frame	0.28	3.34	2.35

10.0 External Roofs		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
Traditional Roof	External Plane Roof	0.11	31.19	31.19
Sloped Roof	External Slope Roof	0.13	19.76	16.70

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Ground Floor	Ground Floor - Solid	0.13	40.50

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Glazed Doors	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.80
Window/Double doors	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60
Roof Light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Entrance	Half Glazed Door	[1] Main Wall	South							1.89	
Side	Half Glazed Door	[1] Main Wall	West							1.89	
Front	Window	[1] Main Wall	South	None	0.00					3.65	
Front	Window	[3] Dormer	South	None	0.00					0.99	
Rear	Window	[1] Main Wall	North	None	0.00					5.40	
Side	Window	[1] Main Wall	West	None	0.00					4.21	
Rear	Roof Window	[2] Sloped Roof	North	None						3.06	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

Yes

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	11.55	0.300	No
Table K1 - Approved	E3 Sill	9.65	0.040	No
Table K1 - Approved	E4 Jamb	37.00	0.050	No
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	46.14	0.070	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	9.00	0.060	No
Table K1 - Approved	E12 Gable (insulation at ceiling level)	13.40	0.240	No
Table K1 - Approved	E13 Gable (insulation at rafter level)	9.74	0.040	No
Table K1 - Approved	E16 Corner (normal)	20.56	0.090	No
Table K1 - Default	R1 Head of roof window	2.55	0.080	No
Table K1 - Default	R2 Sill of roof window	2.55	0.060	No
Table K1 - Default	R3 Jamb of roof window	7.20	0.080	No
Table K1 - Default	R6 Flat ceiling	9.00	0.060	No

Y-value 0.079 W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀

5.00

m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀

m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Windows half open

Cross ventilation possible

Yes

Night Ventilation

Yes

Air change rate

4.00

Mechanical Ventilation

Mechanical Ventilation System Present

No

20.0 Fans, Open Fireplaces, Flues

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

External

External lights fitted

23.0 Electricity Tariff

24.0 Main Heating 1

Description

Percentage of Heat %

Main Heating

SAP Code

Efficiency (Manufacturer) %

Model Name

Manufacturer

Controls

PCDF Controls

Delayed Start Stat

Sap Code

Burner Control

Flue Type

Fan Assisted Flue

Is MHS Pumped

Heat Emitter

Flow Temperature

Combi boiler type

Combi keep hot type

25.0 Main Heating 2

Community Heating

28.0 Water Heating

Water Heating

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Storage System

Solar Panel

Water use <= 125 litres/person/day

SAP Code

29.0 Hot Water Cylinder

32.0 Photovoltaic Unit

PV Cells kWp

2.75

Orientation

South

Elevation

45°

Overshading

None Or Little

Connected to Dwelling

Yes

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£29	A 95	