

PREDICTED ENERGY ASSESSMENT



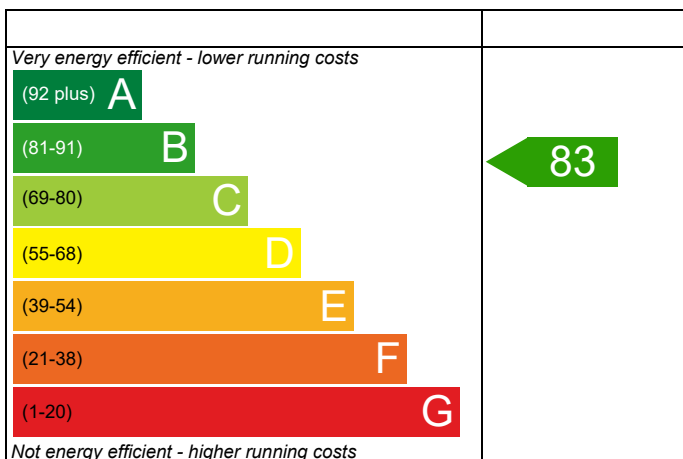
00-6, Building 2

Dwelling type: Flat, Mid-Terrace
Date of assessment: 02/09/2019
Produced by: Harry Davey
Total floor area: 89.06 m²
DRRN: 3392-9001-0414

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

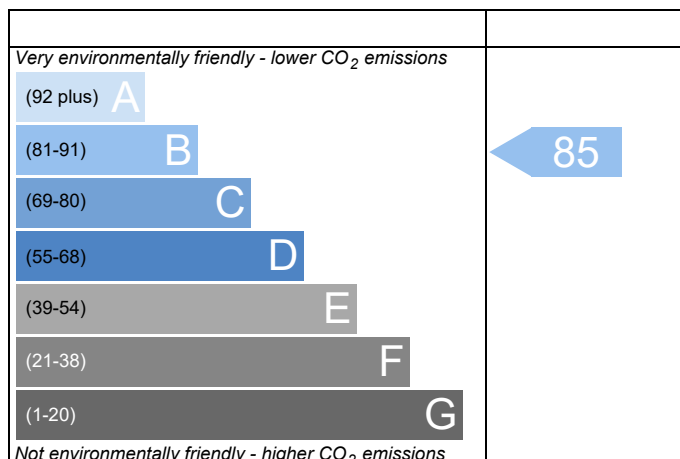


England

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 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)



Property Reference	TPB2-00-F6			Issued on Date	02/09/2019
Assessment Reference	001	Prop Type Ref			
Property	00-6, Building 2				
SAP Rating	83 B	DER	18.78	TER	18.72
Environmental	85 B	% DER<TER	-0.31		
CO ₂ Emissions (t/year)	1.40	DFEE	48.27	TFEE	55.99
General Requirements Compliance	Fail	% DFEE<TFEE	13.78		
Assessor Details	Mr. Harry Davey, energytest, Tel: 01892 315466, hdavey@energy-test.co.uk			Assessor ID	R434-0001
Client					

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

Ground-floor flat, total floor area 89 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) 18.72 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 18.78 kgCO₂/m²Fail
Excess emissions =0.06 kgCO₂/m² (0.3%)

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)56.0 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)48.3 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.23 (max. 0.30)	0.26 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.09 (max. 0.25)	0.09 (max. 0.70)	OK
Roof	(no roof)		
Openings	1.31 (max. 2.00)	1.40 (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:	4.00 (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 37 CDi	
Combi boiler	
Efficiency: 89.4% SEDBUK2009	OK
Minimum: 88.0%	

Secondary heating system:	None
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5 Cylinder insulation

Hot water storage	No cylinder
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6 Controls

Space heating controls:	Time and temperature zone control	OK
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Hot water controls:	No cylinder
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Boiler interlock	Yes	OK
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7 Low energy lights

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

8 Mechanical ventilation

Continuous extract system	
Specific fan power:	0.18
Maximum	0.7

9 Summertime temperature

Overheating risk (Thames Valley):	High	Fail
Based on:		
Overshading:	Average	
Windows facing North East:	15.41 m ² , No overhang	
Air change rate:	0.10 ach	
Blinds/curtains:	Light-coloured curtain or roller blind, closed 100% of daylight hours	

10 Key features

Party wall U-value	0.00 W/m ² K
Exposed floor U-value	0.09 W/m ² K

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	89.0600 (1b)	x 2.5500 (2b)	= 227.1030 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	89.0600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 227.1030 (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					0 * 10 = 0.0000 (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) =				0.0000 / (5) = 0.0000 (8)
Pressure test					Yes
Measured/design AP50					4.0000
Infiltration rate					0.2000 (18)
Number of sides sheltered					3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.1550 (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	0.1976	0.1938	0.1899	0.1705	0.1666	0.1473	0.1473	0.1434	0.1550	0.1666	0.1744	0.1821 (22b)
Mechanical extract ventilation - centralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5000	0.5000	0.5000	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
Window (Uw = 1.30)			15.4100	1.2357	19.0428		(27)
Door to corridor			1.8900	1.4000	2.6460		(26)
Exposed Floor			89.0600	0.0900	8.0154		(28b)
External Wall	33.7600	15.4100	18.3500	0.1700	3.1195		(29a)
Sheltered Wall	34.4300	1.8900	32.5400	0.2578	8.3903		(29a)
Total net area of external elements Aum(A, m2)			157.2500				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2140		(33)
Party Wall			34.2200	0.0000	0.0000		(32)
Party Ceilings 1			89.0600				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							17.3864 (36)
Total fabric heat loss							(33) + (36) = 58.6004 (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	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720	37.4720 (38)
Heat transfer coeff	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724	96.0724 (39)
Average = Sum(39)m / 12 =												96.0724 (39)
HLP	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787	1.0787 (40)
HLP (average)												1.0787 (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												2.6126 (42)
Average daily hot water use (litres/day)												96.2501 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	105.8751	102.0251	98.1751	94.3251	90.4751	86.6251	86.6251	90.4751	94.3251	98.1751	102.0251	105.8751 (44)
Energy conte	157.0097	137.3217	141.7037	123.5407	118.5402	102.2912	94.7878	108.7704	110.0695	128.2754	140.0226	152.0555 (45)
Energy content (annual)												Total = Sum(45)m = 1514.3883 (45)
Distribution loss (46)m = 0.15 x (45)m	23.5515	20.5982	21.2555	18.5311	17.7810	15.3437	14.2182	16.3156	16.5104	19.2413	21.0034	22.8083 (46)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

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	50.0289	46.5165	46.1051	42.7192	44.1432	46.1051	46.5165	50.0289	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	207.9686	183.3491	191.7326	170.0571	164.6453	145.0104	138.9310	154.8755	156.5860	178.3043	189.3377	203.0144	(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	207.9686	183.3491	191.7326	170.0571	164.6453	145.0104	138.9310	154.8755	156.5860	178.3043	189.3377	203.0144	(64)
Heat gains from water heating, kWh/month	64.9454	57.1663	59.6237	52.7064	50.9409	44.6916	42.5527	47.6924	48.2272	55.1588	58.8863	63.2982	(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	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.7541	19.3218	15.7135	11.8962	8.8925	7.5074	8.1121	10.5444	14.1526	17.9700	20.9736	22.3587	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	237.3377	239.8005	233.5943	220.3820	203.7038	188.0286	177.5566	175.0938	181.3000	194.5124	211.1906	226.8657	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	(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)	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	(71)
Water heating gains (Table 5)	87.2923	85.0689	80.1394	73.2033	68.4689	62.0717	57.1946	64.1027	66.9823	74.1382	81.7865	85.0782	(72)
Total internal gains	411.5736	409.3807	394.6367	370.6710	346.2547	322.7973	308.0528	314.9304	327.6244	351.8100	379.1402	399.4921	(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			15.4100	11.2829	0.6300	0.7000	0.7700	53.1370 (75)				

Solar gains	53.1370	108.1618	194.8732	320.0378	430.1936	458.6320	429.0408	342.0363	237.4561	132.1823	66.8601	43.3943 (83)
Total gains	464.7105	517.5426	589.5100	690.7088	776.4484	781.4292	737.0935	656.9667	565.0805	483.9924	446.0003	442.8865 (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	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756	64.3756		
alpha	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917	5.2917		
util living area	0.9990	0.9980	0.9939	0.9732	0.8938	0.7263	0.5602	0.6432	0.9000	0.9888	0.9980	0.9992	(86)	
MIT	20.0351	20.1231	20.3019	20.5558	20.7888	20.9107	20.9408	20.9332	20.8250	20.5315	20.2353	20.0100	(87)	
Th 2	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	20.0182	(88)	
util rest of house	0.9986	0.9973	0.9916	0.9624	0.8529	0.6381	0.4421	0.5204	0.8436	0.9827	0.9971	0.9990	(89)	
MIT 2	18.7155	18.8442	19.1049	19.4696	19.7824	19.9173	19.9401	19.9363	19.8353	19.4393	19.0085	18.6788	(90)	
Living area fraction									fLA = Living area / (4) =			0.3444	(91)	
MIT	19.1699	19.2846	19.5171	19.8437	20.1290	20.2594	20.2847	20.2796	20.1761	19.8155	19.4309	19.1372	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.1699	19.2846	19.5171	19.8437	20.1290	20.2594	20.2847	20.2796	20.1761	19.8155	19.4309	19.1372	(93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	463.8868	515.7483	583.6340	663.0948	666.3468	516.6899	350.1658	364.4561	482.8067	474.8050	444.4152	442.2777	(94)
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	1428.5868	1381.9651	1250.5858	1051.3844	809.7927	543.7142	353.9992	372.7241	583.7463	885.3509	1184.6630	1435.0532	(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	717.7368	582.0977	496.2122	279.5685	106.7237	0.0000	0.0000	0.0000	0.0000	305.4461	532.9785	738.6249	(98)
Space heating												3759.3885	(98)
Space heating per m2										(98) / (4) =		42.2119	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 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 %)													93.3000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													4029.3553 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	717.7368	582.0977	496.2122	279.5685	106.7237	0.0000	0.0000	0.0000	0.0000	305.4461	532.9785	738.6249	(98)
Space heating efficiency (main heating system 1)	93.3000	93.3000	93.3000	93.3000	93.3000	0.0000	0.0000	0.0000	0.0000	93.3000	93.3000	93.3000	(210)
Space heating fuel (main heating system)	769.2784	623.8990	531.8459	299.6447	114.3877	0.0000	0.0000	0.0000	0.0000	327.3806	571.2524	791.6666	(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	207.9686	183.3491	191.7326	170.0571	164.6453	145.0104	138.9310	154.8755	156.5860	178.3043	189.3377	203.0144	(64)
Efficiency of water heater (217)m	87.8155	87.6558	87.2381	86.1945	83.8902	80.2000	80.2000	80.2000	80.2000	86.2944	87.4144	80.2000	(216)
Fuel for water heating, kWh/month	236.8245	209.1693	219.7809	197.2948	196.2630	180.8110	173.2307	193.1116	195.2443	206.6233	216.5979	230.9263	(219)
Water heating fuel used												2455.8775	(219)
Annual totals kWh/year													
Space heating fuel - main system												4029.3553	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
(MEV)Centralised, Database: in-use factor = 1.3000, SFP = 0.2340)													
mechanical ventilation fans (SFP = 0.2340)													64.8334 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													139.8334 (231)
Electricity for lighting (calculated in Appendix L)													384.1840 (232)
Total delivered energy for all uses													7009.2502 (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	4029.3553	0.2160	870.3407	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2455.8775	0.2160	530.4695	(264)
Space and water heating			1400.8103	(265)
Pumps and fans	139.8334	0.5190	72.5735	(267)
Energy for lighting	384.1840	0.5190	199.3915	(268)
Total CO2, kg/year			1672.7753	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			18.7800	(273)

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

DER			18.7800	ZC1
Total Floor Area		TFA	89.0600	
Assumed number of occupants		N	2.6126	
CO2 emission factor in Table 12 for electricity displaced from grid		EF	0.5190	
CO2 emissions from appliances, equation (L14)			15.7918	ZC2
CO2 emissions from cooking, equation (L16)			2.0402	ZC3
Total CO2 emissions			36.6120	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			36.6120	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	89.0600 (1b)	x 2.5500 (2b)	= 227.1030 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	89.0600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 227.1030 (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)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =				Air changes per hour
Pressure test					30.0000 / (5) =
Measured/design AP50					Yes
Infiltration rate					5.0000
Number of sides sheltered					0.3821 (18)
					3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.2961 (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												
Effective ac	0.3776	0.3702	0.3628	0.3257	0.3183	0.2813	0.2813	0.2739	0.2961	0.3183	0.3331	0.3479 (22b)
	0.5713	0.5685	0.5658	0.5531	0.5507	0.5396	0.5396	0.5375	0.5438	0.5507	0.5555	0.5605 (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 Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.40)			15.4100	1.3258	20.4299		(27)
Exposed Floor			89.0600	0.1300	11.5778		(28b)
External Wall	33.7600	15.4100	18.3500	0.1800	3.3030		(29a)
Sheltered Wall	34.4300	1.8900	32.5400	0.1800	5.8572		(29a)
Total net area of external elements Aum(A, m ²)			157.2500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	43.0579		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							15.0458 (36)
Total fabric heat loss						(33) + (36) =	58.1037 (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	42.8137	42.6063	42.4030	41.4480	41.2693	40.4376	40.4376	40.2835	40.7579	41.2693	41.6308	42.0087 (38)
Heat transfer coeff	100.9174	100.7100	100.5067	99.5517	99.3730	98.5413	98.5413	98.3873	98.8617	99.3730	99.7345	100.1124 (39)
Average = Sum(39)m / 12 =												99.5509 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1331	1.1308	1.1285	1.1178	1.1158	1.1065	1.1065	1.1047	1.1101	1.1158	1.1199	1.1241 (40)
HLP (average)												1.1178 (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												2.6126 (42)
Average daily hot water use (litres/day)												96.2501 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	105.8751	102.0251	98.1751	94.3251	90.4751	86.6251	86.6251	90.4751	94.3251	98.1751	102.0251	105.8751 (44)
Energy conte	157.0097	137.3217	141.7037	123.5407	118.5402	102.2912	94.7878	108.7704	110.0695	128.2754	140.0226	152.0555 (45)
Energy content (annual)										Total = Sum(45)m =		1514.3883 (45)
Distribution loss (46)m = 0.15 x (45)m	23.5515	20.5982	21.2555	18.5311	17.7810	15.3437	14.2182	16.3156	16.5104	19.2413	21.0034	22.8083 (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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Combi loss	50.9589	46.0274	50.0289	46.5165	46.1051	42.7192	44.1432	46.1051	46.5165	50.0289	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	207.9686	183.3491	191.7326	170.0571	164.6453	145.0104	138.9310	154.8755	156.5860	178.3043	189.3377	203.0144 (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	207.9686	183.3491	191.7326	170.0571	164.6453	145.0104	138.9310	154.8755	156.5860	178.3043	189.3377	203.0144 (64)
Heat gains from water heating, kWh/month	64.9454	57.1663	59.6237	52.7064	50.9409	44.6916	42.5527	47.6924	48.2272	55.1588	58.8863	63.2982 (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	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.7541	19.3218	15.7135	11.8962	8.8925	7.5074	8.1121	10.5444	14.1526	17.9700	20.9736	22.3587	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	237.3377	239.8005	233.5943	220.3820	203.7038	188.0286	177.5566	175.0938	181.3000	194.5124	211.1906	226.8657	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	(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)	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	(71)
Water heating gains (Table 5)	87.2923	85.0689	80.1394	73.2033	68.4689	62.0717	57.1946	64.1027	66.9823	74.1382	81.7865	85.0782	(72)
Total internal gains	411.5736	409.3807	394.6367	370.6710	346.2547	322.7973	308.0528	314.9304	327.6244	351.8100	379.1402	399.4921	(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				15.4100	11.2829	0.6300		0.7000			0.7700	53.1370 (75)	

Solar gains	53.1370	108.1618	194.8732	320.0378	430.1936	458.6320	429.0408	342.0363	237.4561	132.1823	66.8601	43.3943	(83)
Total gains	464.7105	517.5426	589.5100	690.7088	776.4484	781.4292	737.0935	656.9667	565.0805	483.9924	446.0003	442.8865	(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	61.2850	61.4112	61.5354	62.1257	62.2374	62.7627	62.7627	62.8610	62.5594	62.2374	62.0119	61.7778	
alpha	5.0857	5.0941	5.1024	5.1417	5.1492	5.1842	5.1842	5.1907	5.1706	5.1492	5.1341	5.1185	
util living area	0.9990	0.9980	0.9941	0.9747	0.9008	0.7373	0.5722	0.6545	0.9056	0.9892	0.9980	0.9992	(86)
MIT	19.7084	19.8307	20.0776	20.4364	20.7615	20.9420	20.9874	20.9760	20.8190	20.4114	20.0020	19.6869	(87)
Th 2	19.9739	19.9758	19.9776	19.9863	19.9880	19.9956	19.9956	19.9970	19.9926	19.9880	19.9846	19.9812	(88)
util rest of house	0.9986	0.9973	0.9919	0.9644	0.8610	0.6479	0.4498	0.5284	0.8504	0.9833	0.9971	0.9989	(89)
MIT 2	18.2422	18.4225	18.7838	19.3065	19.7470	19.9560	19.9908	19.9865	19.8339	19.2777	18.6796	18.2160	(90)
Living area fraction									fLA = Living area / (4) =			0.3444	(91)
MIT	18.7471	18.9074	19.2294	19.6956	20.0963	20.2955	20.3340	20.3272	20.1732	19.6681	19.1350	18.7225	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7471	18.9074	19.2294	19.6956	20.0963	20.2955	20.3340	20.3272	20.1732	19.6681	19.1350	18.7225	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9980	0.9962	0.9896	0.9606	0.8659	0.6764	0.4923	0.5721	0.8622	0.9807	0.9961	0.9984	(94)
Ext temp.	463.7653	515.5565	583.3565	663.4900	672.3588	528.5909	362.8572	375.8768	487.2343	474.6612	444.2579	442.1843	(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	1457.9682	1410.6902	1279.3870	1074.7234	834.3709	561.2459	367.9527	386.3911	600.4041	901.1251	1200.3052	1453.8870	(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	739.6870	601.5299	517.8467	296.0880	120.5370	0.0000	0.0000	0.0000	0.0000	317.2892	544.3540	752.7068	(98)
												3890.0386	(98)
												43.6789	(99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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													4164.9235 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	739.6870	601.5299	517.8467	296.0880	120.5370	0.0000	0.0000	0.0000	0.0000	317.2892	544.3540	752.7068	(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)	791.9561	644.0363	554.4397	317.0108	129.0546	0.0000	0.0000	0.0000	0.0000	339.7100	582.8202	805.8959	(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	207.9686	183.3491	191.7326	170.0571	164.6453	145.0104	138.9310	154.8755	156.5860	178.3043	189.3377	203.0144	(64)
Efficiency of water heater	87.9717	87.8197	87.4286	86.4339	84.2799	80.3000	80.3000	80.3000	80.3000	86.4863	87.5580	88.0476	(217)
Fuel for water heating, kWh/month	236.4039	208.7790	219.3018	196.7482	195.3553	180.5858	173.0150	192.8711	195.0012	206.1648	216.2426	230.5736	(219)
Water heating fuel used												2451.0423	(219)
Annual totals kWh/year													
Space heating fuel - main system													4164.9235 (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)													384.1840 (232)
Total delivered energy for all uses													7075.1498 (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	4164.9235	0.2160	899.6235 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2451.0423	0.2160	529.4251 (264)
Space and water heating			1429.0486 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	384.1840	0.5190	199.3915 (268)
Total CO2, kg/m2/year			1667.3651 (272)
Emissions per m2 for space and water heating			16.0459 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.2388 (272b)
Emissions per m2 for pumps and fans			0.4371 (272c)
Target Carbon Dioxide Emission Rate (TER) = (16.0459 * 1.00) + 2.2388 + 0.4371, rounded to 2 d.p.			18.7200 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	TPB2-00-F6			Issued on Date	02/09/2019
Assessment Reference	001	Prop Type Ref			
Property	00-6, Building 2				
SAP Rating	83 B	DER	18.78	TER	18.72
Environmental	85 B	% DER<TER	-0.31		
CO ₂ Emissions (t/year)	1.40	DFEE	48.27	TFEE	55.99
General Requirements Compliance	Fail	% DFEE<TFEE	13.78		
Assessor Details	Mr. Harry Davey, energytest, Tel: 01892 315466, hdavey@energy-test.co.uk			Assessor ID	R434-0001
Client					

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	89.0600	2.5500	227.1030
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	89.0600		
Dwelling volume			227.1030

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				30.0000 / (5) =	0.1321 (8)
Pressure test				Yes	
Measured/design AP50				4.0000	
Infiltration rate				0.3321	(18)
Number of sides sheltered				3	(19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2574 (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
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
Adj infilt rate	0.3282	0.3217	0.3153	0.2831	0.2767	0.2445	0.2445	0.2381	0.2574	0.2767	0.2895	0.3024
Effective ac	0.5538	0.5518	0.5497	0.5401	0.5383	0.5299	0.5299	0.5283	0.5331	0.5383	0.5419	0.5457

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
Window (Uw = 1.30)			15.4100	1.2357	19.0428		(27)
Door to corridor			1.8900	1.4000	2.6460		(26)
Exposed Floor			89.0600	0.0900	8.0154		(28b)
External Wall	33.7600	15.4100	18.3500	0.1700	3.1195		(29a)
Sheltered Wall	34.4300	1.8900	32.5400	0.2578	8.3903		(29a)
Total net area of external elements Aum(A, m ²)			157.2500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.2140		(33)
Party Wall			34.2200	0.0000	0.0000		(32)
Party Ceilings 1			89.0600				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							17.3864 (36)
Total fabric heat loss						(33) + (36) =	58.6004 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	41.5072	41.3505	41.1969	40.4755	40.3405	39.7122	39.7122
Heat transfer coeff	100.1076	99.9509	99.7973	99.0759	98.9409	98.3126	98.3126
Average = Sum(39)m / 12 =							99.0753 (39)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1240	1.1223	1.1206	1.1125	1.1109	1.1039	1.1039	1.1026	1.1066	1.1109	1.1140	1.1172	(40)
Days in month												1.1125	(40)
	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6126 (42)
Average daily hot water use (litres/day)													96.2501 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	105.8751	102.0251	98.1751	94.3251	90.4751	86.6251	86.6251	90.4751	94.3251	98.1751	102.0251	105.8751	(44)
Energy conte	157.0097	137.3217	141.7037	123.5407	118.5402	102.2912	94.7878	108.7704	110.0695	128.2754	140.0226	152.0555	(45)
Energy content (annual)													1514.3883 (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	33.3646	29.1809	30.1120	26.2524	25.1898	21.7369	20.1424	23.1137	23.3898	27.2585	29.7548	32.3118	(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	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.7541	19.3218	15.7135	11.8962	8.8925	7.5074	8.1121	10.5444	14.1526	17.9700	20.9736	22.3587	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	237.3377	239.8005	233.5943	220.3820	203.7038	188.0286	177.5566	175.0938	181.3000	194.5124	211.1906	226.8657	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	(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)	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	(71)
Water heating gains (Table 5)	44.8448	43.4239	40.4732	36.4617	33.8573	30.1901	27.0731	31.0668	32.4858	36.6378	41.3261	43.4298	(72)
Total internal gains	366.1261	364.7357	351.9705	330.9293	308.6430	287.9157	274.9313	278.8945	290.1279	311.3097	335.6798	354.8438	(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				15.4100	11.2829		0.6300		0.7000		0.7700		53.1370 (75)	
Solar gains	53.1370	108.1618	194.8732	320.0378	430.1936	458.6320	429.0408	342.0363	237.4561	132.1823	66.8601	43.3943	(83)	
Total gains	419.2631	472.8976	546.8437	650.9671	738.8367	746.5476	703.9721	620.9308	527.5840	443.4920	402.5399	398.2381	(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	61.7807	61.8776	61.9728	62.4241	62.5092	62.9087	62.9087	62.9833	62.7542	62.5092	62.3372	62.1584	
alpha	5.1187	5.1252	5.1315	5.1616	5.1673	5.1939	5.1939	5.1989	5.1836	5.1673	5.1558	5.1439	
util living area	0.9994	0.9987	0.9958	0.9800	0.9145	0.7594	0.5946	0.6834	0.9241	0.9926	0.9988	0.9995	(86)
MIT	19.6726	19.7950	20.0431	20.4045	20.7404	20.9338	20.9851	20.9709	20.7954	20.3747	19.9629	19.6490	(87)
Th 2	19.9812	19.9827	19.9841	19.9907	19.9919	19.9977	19.9977	19.9987	19.9954	19.9919	19.9894	19.9868	(88)
util rest of house	0.9991	0.9982	0.9941	0.9715	0.8784	0.6711	0.4693	0.5556	0.8759	0.9884	0.9982	0.9994	(89)
MIT 2	18.7618	18.8852	19.1337	19.4955	19.8098	19.9661	19.9937	19.9898	19.8690	19.4706	19.0585	18.7426	(90)
Living area fraction	19.0755	19.1985	19.4469	19.8085	20.1303	20.2994	20.3351	20.3277	20.1880	19.7819	19.3700	19.0547	(91)
MIT	19.0755	19.1985	19.4469	19.8085	20.1303	20.2994	20.3351	20.3277	20.1880	19.7819	19.3700	19.0547	(92)
Temperature adjustment													0.0000
adjusted MIT	19.0755	19.1985	19.4469	19.8085	20.1303	20.2994	20.3351	20.3277	20.1880	19.7819	19.3700	19.0547	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9989	0.9977	0.9930	0.9696	0.8841	0.6998	0.5130	0.6003	0.8871	0.9873	0.9978	0.9991	(94)
Ext temp.	418.7896	471.8034	542.9989	631.1892	653.2184	522.4234	361.1242	372.7166	467.9938	437.8421	401.6424	397.8959	(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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

Month fracti	1479.1373	1429.1481	1292.0673	1080.7706	834.0988	560.3192	367.2120	385.6830	600.0041	908.4668	1217.3510	1478.0385 (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	788.8987	643.3357	557.3069	323.6986	134.5750	0.0000	0.0000	0.0000	0.0000	350.1447	587.3102	803.6261 (98)
Space heating per m2												4188.8958 (98)
												(98) / (4) = 47.0345 (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												
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	924.1386	727.5134	746.2916	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.8586	0.9192	0.8772	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	793.4971	668.6989	654.6662	0.0000	0.0000	0.0000	0.0000 (102)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	971.2029	919.3805	824.0856	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	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						127.9481	186.5071	126.0480	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction												440.5032 (104)
Intermittency factor (Table 10b)												1.0000 (105)
Space cooling kWh	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						31.9870	46.6268	31.5120	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling per m2												110.1258 (107)
Energy for space heating												1.2365 (108)
Energy for space cooling												47.0345 (99)
Total												1.2365 (108)
Dwelling Fabric Energy Efficiency (DFEE)												48.2711 (109)
												48.3 (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	89.0600 (1b)	x 2.5500 (2b)	= 227.1030 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	89.0600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 227.1030 (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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				30.0000 / (5) =	0.1321 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3821 (18)
Number of sides sheltered					3 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.7750 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2961 (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												
Effective ac	0.3776	0.3702	0.3628	0.3257	0.3183	0.2813	0.2813	0.2739	0.2961	0.3183	0.3331	0.3479 (22b)
Effective ac	0.5713	0.5685	0.5658	0.5531	0.5507	0.5396	0.5396	0.5375	0.5438	0.5507	0.5555	0.5605 (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 Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.40)			15.4100	1.3258	20.4299		(27)
Exposed Floor			89.0600	0.1300	11.5778		(28b)
External Wall	33.7600	15.4100	18.3500	0.1800	3.3030		(29a)
Sheltered Wall	34.4300	1.8900	32.5400	0.1800	5.8572		(29a)
Total net area of external elements Aum(A, m ²)			157.2500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	43.0579		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							15.0458 (36)
Total fabric heat loss						(33) + (36) =	58.1037 (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	42.8137	42.6063	42.4030	41.4480	41.2693	40.4376	40.4376	40.2835	40.7579	41.2693	41.6308	42.0087 (38)
Heat transfer coeff	100.9174	100.7100	100.5067	99.5517	99.3730	98.5413	98.5413	98.3873	98.8617	99.3730	99.7345	100.1124 (39)
Average = Sum(39)m / 12 =												99.5509 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1331	1.1308	1.1285	1.1178	1.1158	1.1065	1.1065	1.1047	1.1101	1.1158	1.1199	1.1241 (40)
HLP (average)												1.1178 (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												2.6126 (42)
Average daily hot water use (litres/day)												96.2501 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	105.8751	102.0251	98.1751	94.3251	90.4751	86.6251	86.6251	90.4751	94.3251	98.1751	102.0251	105.8751 (44)
Energy conte	157.0097	137.3217	141.7037	123.5407	118.5402	102.2912	94.7878	108.7704	110.0695	128.2754	140.0226	152.0555 (45)
Energy content (annual)										Total = Sum(45)m =		1514.3883 (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	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	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	0.0000 (57)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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	33.3646	29.1809	30.1120	26.2524	25.1898	21.7369	20.1424	23.1137	23.3898	27.2585	29.7548	32.3118 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317	130.6317 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	21.7541	19.3218	15.7135	11.8962	8.8925	7.5074	8.1121	10.5444	14.1526	17.9700	20.9736	22.3587 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	237.3377	239.8005	233.5943	220.3820	203.7038	188.0286	177.5566	175.0938	181.3000	194.5124	211.1906	226.8657 (68)
Pumps, fans	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632	36.0632 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054	-104.5054 (71)
Total internal gains	44.8448	43.4239	40.4732	36.4617	33.8573	30.1901	27.0731	31.0668	32.4858	36.6378	41.3261	43.4298 (72)
	366.1261	364.7357	351.9705	330.9293	308.6430	287.9157	274.9313	278.8945	290.1279	311.3097	335.6798	354.8438 (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		15.4100	11.2829	0.6300	0.7000	0.7700	53.1370 (75)
Solar gains	53.1370	108.1618	194.8732	320.0378	430.1936	458.6320	429.0408
Total gains	419.2631	472.8976	546.8437	650.9671	738.8367	746.5476	703.9721

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)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	61.2850	61.4112	61.5354	62.1257	62.2374	62.7627	62.7627	62.8610	62.5594	62.2374	62.0119	61.7778
util living area	5.0857	5.0941	5.1024	5.1417	5.1492	5.1842	5.1842	5.1907	5.1706	5.1492	5.1341	5.1185
MIT	0.9994	0.9987	0.9958	0.9801	0.9153	0.7603	0.5957	0.6843	0.9245	0.9926	0.9988	0.9995 (86)
Th 2	19.6605	19.7839	20.0336	20.3990	20.7369	20.9330	20.9849	20.9706	20.7935	20.3705	19.9563	19.6397 (87)
util rest of house	19.9739	19.9758	19.9776	19.9863	19.9880	19.9956	19.9956	19.9970	19.9926	19.9880	19.9846	19.9812 (88)
MIT 2	0.9991	0.9982	0.9942	0.9717	0.8792	0.6720	0.4700	0.5563	0.8765	0.9885	0.9982	0.9994 (89)
Living area fraction	18.7438	18.8686	19.1191	19.4866	19.8033	19.9637	19.9916	19.9880	19.8650	19.4632	19.0481	18.7289 (90)
MIT	19.0595	19.1838	19.4340	19.8008	20.1248	20.2975	20.3336	20.3263	fLA = Living area / (4) =			0.3444 (91)
Temperature adjustment	20.1848	19.7756	19.3609	19.0426	19.0426	19.0426	19.0426	19.0426	20.1848	19.7756	19.3609	19.0426 (92)
adjusted MIT	19.0595	19.1838	19.4340	19.8008	20.1248	20.2975	20.3336	20.3263	20.1848	19.7756	19.3609	19.0426 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9989	0.9977	0.9930	0.9698	0.8849	0.7007	0.5138	0.6010	0.8876	0.9873	0.9978	0.9991 (94)
Ext temp.	418.7854	471.7987	543.0051	631.2968	653.7960	523.0753	361.7298	373.1800	468.2686	437.8565	401.6396	397.8932 (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	1489.4914	1438.5231	1299.9571	1085.1957	837.2010	561.4359	367.9186	386.3022	601.5493	911.8112	1222.8341	1485.9275 (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	796.6053	649.6388	563.1723	326.8072	136.4533	0.0000	0.0000	0.0000	0.0000	352.6223	591.2600	809.4975 (98)
Space heating per m2												4226.0567 (98)
												47.4518 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
Ext. temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (100)
Useful 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 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (102)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (103a)
Space cooling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction												438.8211 (104)
Intermittency factor (Table 10b)												1.0000 (105)
	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)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	31.8488	46.4546	31.4019	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												109.7053 (107)
Space cooling per m2												1.2318 (108)
Energy for space heating												47.4518 (99)
Energy for space cooling												1.2318 (108)
Total												48.6836 (109)
Target Fabric Energy Efficiency (TFEE)												56.0 (109)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	TPB2-00-F6	Issued on Date	02/09/2019
Assessment Reference	001	Prop Type Ref	
Property	00-6, Building 2		
SAP Rating	83 B	DER	18.78
Environmental	85 B	TER	18.72
CO ₂ Emissions (t/year)	1.40	% DER<TER	-0.31
General Requirements Compliance	Fail	DFEE	48.27
		TFEE	55.99
		% DFEE<TFEE	13.78
Assessor Details	Mr. Harry Davey, energytest, Tel: 01892 315466, hdavey@energy-test.co.uk		Assessor ID
Client	R434-0001		

SUMMARY 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)	18.72	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.78	kgCO ₂ /m ²	
Excess emissions	0.06 (0.3%)	kgCO ₂ /m ²	Fail

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.99	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	48.27	kWh/m ² /yr	
	-7.7 (-13.8%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.23 (max. 0.30)	0.26 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.09 (max. 0.25)	0.09 (max. 0.70)	Pass
Openings	1.31 (max. 2.00)	1.40 (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	4.00 (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 database Worcester Greenstar 37 CDi Combi boiler Efficiency: 89.4% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Continuous extract system

Specific fan power

Maximum

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)

Based on:

Overshading

Windows facing North East

Air change rate

Blinds/curtains

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

Maximum

10 Key features

Party wall U-value W/m²K

Exposed floor U-value W/m²K

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

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)



Block Reference	TP Bd 2	Issued on Date	02/09/2019
Block Name			
Assessor Details	Mr. Harry Davey, energytest, Tel: 01892 315466, hdavey@energy-test.co.uk	Assessor ID	R434-0001
Client			

Block Compliance Report - DER

Block Reference: TP Bd 2		Block Name:		
Property-Assessment Reference	Multiplier	Floor Area (m²)	DER (kgCO₂/m²)	TER (kgCO₂/m²)
TPB2-00F1-001	1	95.96	-159.58	17.48
TPB2-00-F2-001	1	95.96	18.74	18.73
TPB2-00-F3-001	1	77.16	18.62	18.47
TPB2-00-F4-001	1	78.67	19.25	19.27
TPB2-00-F5-001	1	56.62	20.74	20.25
TPB2-00-F6-001	1	89.06	18.78	18.72
TPB2-00-F7-001	1	86.96	17.07	17.39
TPB2-00-F8-001	1	86.96	18.12	18.39
TPB2-01-F9-001	1	95.96	14.90	14.65
TPB2-01-F10-001	1	95.96	16.28	15.84
TPB2-01-F11-001	1	77.16	17.29	17.07
TPB2-01-F12-001	1	78.67	16.59	16.20
TPB2-01-F13-001	1	56.62	17.88	16.99
TPB2-01-F14-001	1	89.06	16.18	15.71
TPB2-01-F15-001	1	86.96	14.64	14.54
TPB2-01-F16-001	1	86.96	15.60	15.45
TPB2-02-F17-001	1	95.96	16.97	16.49
TPB2-02-F18-001	1	95.96	18.46	17.73
TPB2-02-F19-001	1	77.16	18.19	18.09
TPB2-02-F20-001	1	78.67	17.62	17.31
TPB2-02-F21-001	1	56.62	18.84	18.05
TPB2-02-F22-001	1	89.06	17.09	16.72
TPB2-02-F23-001	1	86.96	16.44	16.22
TPB2-02-F24-001	1	86.96	17.46	17.16
TPB2-03-F25-001	1	87.5	17.96	18.61
TPB2-03-F26-001	1	105.94	17.34	18.36
TPB2-03-F27-001	1	86.33	17.64	18.10
TPB2-03-F28-001	1	105.85	16.67	17.48
Totals:	28	2387.67	311.78	485.47
Average DER = 10.25 kgCO₂/m²			PASS	
Average TER = 17.28 kgCO₂/m²				

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)



Block Compliance Report - DFEE

Block Reference: TP Bd 2		Block Name:		
Property-Assessment Reference	Multiplier	Floor Area (m²)	DFEE (kWh/m²/yr)	TFEE (kWh/m²/yr)
TPB2-00F1-001	1	95.96	45.17	52.78
TPB2-00-F2-001	1	95.96	51.13	58.90
TPB2-00-F3-001	1	77.16	44.88	51.15
TPB2-00-F4-001	1	78.67	47.71	55.37
TPB2-00-F5-001	1	56.62	47.43	53.24
TPB2-00-F6-001	1	89.06	48.27	55.99
TPB2-00-F7-001	1	86.96	42.06	49.82
TPB2-00-F8-001	1	86.96	46.37	54.69
TPB2-01-F9-001	1	95.96	35.18	38.47
TPB2-01-F10-001	1	95.96	40.84	44.23
TPB2-01-F11-001	1	77.16	39.24	44.01
TPB2-01-F12-001	1	78.67	36.42	39.68
TPB2-01-F13-001	1	56.62	35.24	36.66
TPB2-01-F14-001	1	89.06	37.24	40.63
TPB2-01-F15-001	1	86.96	31.79	35.46
TPB2-01-F16-001	1	86.96	35.78	39.90
TPB2-02-F17-001	1	95.96	43.88	47.74
TPB2-02-F18-001	1	95.96	49.93	53.82
TPB2-02-F19-001	1	77.16	43.05	49.21
TPB2-02-F20-001	1	78.67	40.79	45.33
TPB2-02-F21-001	1	56.62	39.35	42.04
TPB2-02-F22-001	1	89.06	41.10	45.76
TPB2-02-F23-001	1	86.96	39.40	43.90
TPB2-02-F24-001	1	86.96	43.61	48.50
TPB2-03-F25-001	1	87.5	45.55	56.94
TPB2-03-F26-001	1	105.94	47.09	60.54
TPB2-03-F27-001	1	86.33	43.12	53.39
TPB2-03-F28-001	1	105.85	44.26	56.05
Totals:	28	2387.67	1,185.89	1,354.22
Average DFEE = 42.52 kWh/m²/yr			PASS	
Average TFEE = 48.73 kWh/m²/yr				