



SAP Report Submission for Building Regulations Compliance

Client: Cheryl Simmonds
Belford Property Holdings Ltd

Project: 2, Belford House, 53 Hampton Road
Forest Gate, E7 0PD

Contact: Gareth John
Myideashed

Report Issue Date: 26/08/2024

EXCELLENCE
IN ENERGY
ASSESSMENT

PREDICTED ENERGY ASSESSMENT

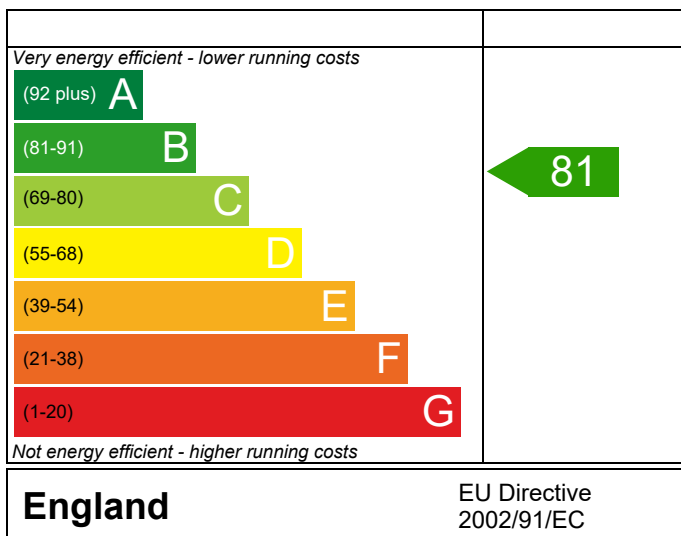
2, Belford House, 53 Hampton Road,
Forest Gate,
E7 0PD

Dwelling type: Maisonette, Semi-Detached
Date of assessment: 26/08/2024
Produced by: Iftikhar Ahmed
Total floor area: 92.12 m²
DRRN: 0122-6888-2046

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.

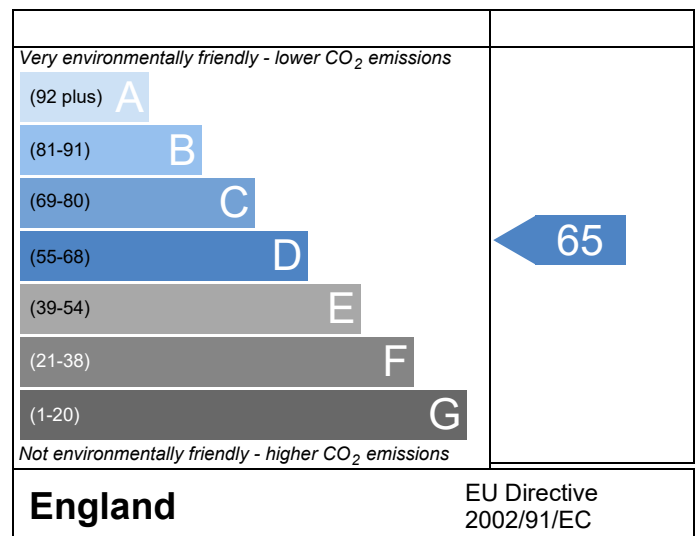
The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating



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



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: Conversion (As Designed)

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Property	2, Belford House, 53 Hampton Road, Forest Gate, E7 OPD		

SAP Rating	81 B	DER	N/A	TER	N/A
Environmental	65 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.90	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk	Assessor ID	D226-0001
Client	Cheryl Simmonds, Forest Gate		

CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF HEAT DEMAND 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	4.6500 (1b)	x 3.1600 (2b)	= 14.6940 (1b) - (3b)
First floor	87.4700 (1c)	x 2.8100 (2c)	= 245.7907 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	92.1200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 260.4847 (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										2 * 10 =		20.0000	(7a)
Number of passive vents										0 * 10 =		0.0000	(7b)
Number of flueless gas fires										0 * 40 =		0.0000	(7c)
Air changes per hour													
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =										20.0000 / (5) =	0.0768	(8)
Pressure test	No												
Measured/design AP50	15.0000												
Infiltration rate	0.8268 (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) =										0.5787	(21)	
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	4.2000	4.0000	4.0000	3.7000	3.7000	3.2000	3.3000	3.5000	3.3000	3.5000	3.5000	3.9000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8000	0.8250	0.8750	0.8250	0.8750	0.8750	0.9750	(22a)
Adj infilt rate	0.6077	0.5787	0.5787	0.5353	0.5353	0.4630	0.4775	0.5064	0.4775	0.5064	0.5064	0.5643	(22b)
Effective ac	0.6846	0.6675	0.6675	0.6433	0.6433	0.6072	0.6140	0.6282	0.6140	0.6282	0.6282	0.6592	(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
External Glazing (Uw = 1.00)			15.0100	0.9615	14.4327		(27)
External door			2.1500	1.0000	2.1500		(26a)
Glazed Door (Uw = 1.00)			2.1400	0.9615	2.0577		(27)
Heat Loss Floor 1			4.6500	0.1700	0.7905		(28a)
External Wall 1	101.9500	17.1500	84.8000	0.1700	14.4160		(29a)
Studwall	17.5400	2.1500	15.3900	0.2107	3.2426		(29a)
External Roof 1	67.4700		67.4700	0.1800	12.1446		(30)
External Roof 2	20.0000		20.0000	0.1100	2.2000		(30)
Total net area of external elements Aum(A, m ²)			211.6100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	51.4341		(33)
Party Wall 1			32.5300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)							31.7415 (36)
Total fabric heat loss						(33) + (36) =	83.1756 (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
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FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

(38)m	58.8516	57.3760	57.3760	55.2976	55.2976	52.1934	52.7783	54.0019	52.7783	54.0019	54.0019	56.6652	(38)
Heat transfer coeff	142.0272	140.5516	140.5516	138.4732	138.4732	135.3690	135.9539	137.1775	135.9539	137.1775	137.1775	139.8408	(39)
Average = Sum(39)m / 12 =												138.2272	(39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.5418	1.5257	1.5257	1.5032	1.5032	1.4695	1.4758	1.4891	1.4758	1.4891	1.4891	1.5180	(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													2.6536	(42)
Average daily hot water use (litres/day)													97.2240	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
	106.9463	103.0574	99.1684	95.2795	91.3905	87.5016	87.5016	91.3905	95.2795	99.1684	103.0574	106.9463	(44)	
Energy content	158.5983	138.7111	143.1375	124.7907	119.7397	103.3262	95.7469	109.8710	111.1832	129.5733	141.4394	153.5940	(45)	
Energy content (annual)										Total =	Sum (45)m =	1529.7114	(45)	
Distribution loss (46)m = 0.15 x (45)m														
	23.7898	20.8067	21.4706	18.7186	17.9609	15.4989	14.3620	16.4806	16.6775	19.4360	21.2159	23.0391	(46)	
Water storage loss:														
Store volume													150.0000	(47)
b) If manufacturer declared loss factor is not known :														
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0084	(51)
Volume factor from Table 2a													0.9283	(52)
Temperature factor from Table 2b													0.6000	(53)
Enter (49) or (54) in (55)													0.6979	(55)
Total storage loss														
	21.6360	19.5422	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360	20.9381	21.6360	20.9381	21.6360	(56)	
If cylinder contains dedicated solar storage														
	21.6360	19.5422	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360	20.9381	21.6360	20.9381	21.6360	(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)	
Total heat required for water heating calculated for each month														
	180.2344	158.2533	164.7735	145.7288	141.3757	124.2643	117.3830	131.5070	132.1213	151.2093	162.3775	175.2301	(62)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)	
								Solar input (sum of months) =	Sum (63)m =			0.0000	(63)	
Output from w/h														
	180.2344	158.2533	164.7735	145.7288	141.3757	124.2643	117.3830	131.5070	132.1213	151.2093	162.3775	175.2301	(64)	
								Total per year (kWh/year) =	Sum (64)m =			1784.4582	(64)	
RHI water heating demand												1784	(64)	
Heat gains from water heating, kWh/month														
	70.0428	61.7552	64.9020	58.2434	57.1223	51.1064	49.1447	53.8409	53.7189	60.3919	63.7791	68.3788	(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	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	56.2879	49.9944	40.6582	30.7809	23.0090	19.4252	20.9896	27.2831	36.6193	46.4967	54.2685	57.8523	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	362.5737	366.3360	356.8550	336.6709	311.1921	287.2456	271.2479	267.4855	276.9666	297.1507	322.6295	346.5759	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	(71)
Water heating gains (Table 5)	94.1435	91.8977	87.2339	80.8936	76.7772	70.9812	66.0547	72.3668	74.6096	81.1720	88.5820	91.9070	(72)
Total internal gains	619.6533	614.8764	591.3953	554.9936	517.6266	484.3003	464.9405	473.7838	494.8438	531.4676	572.1283	602.9836	(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					4.4200	11.9672	0.6800	0.7000			0.7700			17.4484 (74)
East					2.4700	22.3142	0.6800	0.7000			0.7700			18.1810 (76)
South					7.3400	50.8329	0.6800	0.7000			0.7700			123.0781 (78)
West					0.7800	22.3142	0.6800	0.7000			0.7700			5.7414 (80)
North					2.1400	11.9672	0.6800	0.7000			0.7700			8.4479 (74)
Solar gains	172.8967	258.3654	364.3243	491.9499	551.6078	599.4644	575.7612	524.1718	446.8267	318.8081	212.7055			146.2252 (83)
Total gains	792.5501	873.2417	955.7196	1046.9435	1069.2345	1083.7646	1040.7017	997.9556	941.6705	850.2757	784.8337			749.2088 (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)														
tau	45.0422	45.5151	45.5151	46.1983	46.1983	47.2576	47.0544	46.6346	47.0544	46.6346	46.6346	45.7465		
alpha	4.0028	4.0343	4.0343	4.0799	4.0799	4.1505	4.1370	4.1090	4.1370	4.1090	4.1090	4.0498		
util living area														

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

	0.9887	0.9823	0.9637	0.9073	0.7800	0.5280	0.2990	0.3276	0.6766	0.9133	0.9771	0.9907 (86)
MIT	19.8882	20.0132	20.2546	20.5713	20.8114	20.9298	20.9465	20.9455	20.8939	20.6271	20.2298	19.8785 (87)
Th 2	19.6563	19.6682	19.6682	19.6851	19.6851	19.7105	19.7057	19.6957	19.7057	19.6957	19.6957	19.6740 (88)
util rest of house												
	0.9845	0.9758	0.9494	0.8693	0.6902	0.3838	0.1314	0.1506	0.5396	0.8682	0.9670	0.9872 (89)
MIT 2	18.2370	18.4259	18.7706	19.2169	19.5055	19.6283	19.6290	19.6184	19.6033	19.3076	18.7599	18.2361 (90)
Living area fraction									fLA = Living area / (4) =			0.3875 (91)
MIT	18.8769	19.0410	19.3457	19.7418	20.0116	20.1326	20.1396	20.1327	20.1034	19.8189	19.3296	18.8726 (92)
Temperature adjustment												0.0000
adjusted MIT	18.8769	19.0410	19.3457	19.7418	20.0116	20.1326	20.1396	20.1327	20.1034	19.8189	19.3296	18.8726 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9812	0.9717	0.9450	0.8712	0.7151	0.4329	0.1879	0.2104	0.5853	0.8734	0.9633	0.9843	(94)
Useful gains	777.6877	848.5093	903.1839	912.1176	764.6064	469.1210	195.5575	209.9814	551.1973	742.6063	756.0187	737.4528	(95)
Ext temp.	5.7000	6.2000	8.0000	10.6000	13.7000	16.6000	18.7000	18.6000	15.8000	12.3000	8.6000	5.7000	(96)
Heat loss rate W	1871.4836	1804.8292	1594.6585	1265.8873	873.9831	478.2111	195.7156	210.2575	585.0675	1031.4299	1471.8536	1842.0610	(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	813.7842	642.6470	514.4571	254.7142	81.3763	0.0000	0.0000	0.0000	0.0000	214.8847	515.4011	821.8285	(98)
Space heating												3859.0931	(98)
RHI space heating demand												3859	(98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	4.6500 (1b)	x 3.1600 (2b)	= 14.6940 (1b) - (3b)
First floor	87.4700 (1c)	x 2.8100 (2c)	= 245.7907 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	92.1200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 260.4847 (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					2 * 10 = 20.0000 (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) =					20.0000 / (5) = 0.0768 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					0.8268 (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) =		0.5787 (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	0.7379	0.7234	0.7090	0.6366	0.6222	0.5498	0.5498	0.5353	0.5787	0.6222	0.6511	0.6800 (22b)
Effective ac	0.7722	0.7617	0.7513	0.7026	0.6935	0.6511	0.6511	0.6433	0.6675	0.6935	0.7120	0.7312 (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
External Glazing (Uw = 1.00)			15.0100	0.9615	14.4327		(27)
External door			2.1500	1.0000	2.1500		(26a)
Glazed Door (Uw = 1.00)			2.1400	0.9615	2.0577		(27)
Heat Loss Floor 1			4.6500	0.1700	0.7905		(28a)
External Wall 1	101.9500	17.1500	84.8000	0.1700	14.4160		(29a)
Studwall	17.5400	2.1500	15.3900	0.2107	3.2426		(29a)
External Roof 1	67.4700		67.4700	0.1800	12.1446		(30)
External Roof 2	20.0000		20.0000	0.1100	2.2000		(30)
Total net area of external elements Aum(A, m ²)			211.6100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	51.4341		(33)
Party Wall 1			32.5300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)							31.7415 (36)
Total fabric heat loss						(33) + (36) =	83.1756 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	66.3825	65.4737	64.5830	60.3991	59.6164	55.9724	55.9724	55.2976	57.3760	59.6164	61.1999	62.8555 (38)
Heat transfer coeff	149.5581	148.6493	147.7586	143.5748	142.7920	139.1480	139.1480	138.4732	140.5516	142.7920	144.3755	146.0311 (39)
Average = Sum(39)m / 12 =												143.5710 (39)
HLP	1.6235	1.6136	1.6040	1.5586	1.5501	1.5105	1.5105	1.5032	1.5257	1.5501	1.5673	1.5852 (40)
HLP (average)												1.5585 (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												2.6536 (42)
Average daily hot water use (litres/day)												97.2240 (43)
Daily hot water use	106.9463	103.0574	99.1684	95.2795	91.3905	87.5016	87.5016	91.3905	95.2795	99.1684	103.0574	106.9463 (44)
Energy conte	158.5983	138.7111	143.1375	124.7907	119.7397	103.3262	95.7469	109.8710	111.1832	129.5733	141.4394	153.5940 (45)
Energy content (annual)										Total = Sum(45)m =		1529.7114 (45)
Distribution loss (46)m = 0.15 x (45)m	23.7898	20.8067	21.4706	18.7186	17.9609	15.4989	14.3620	16.4806	16.6775	19.4360	21.2159	23.0391 (46)

Water storage loss:												150.0000 (47)
Store volume												
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0084 (51)
Volume factor from Table 2a												0.9283 (52)
Temperature factor from Table 2b												0.6000 (53)
Enter (49) or (54) in (55)												0.6979 (55)
Total storage loss												
21.6360	19.5422	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360 (56)
If cylinder contains dedicated solar storage												
21.6360	19.5422	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360 (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)
Total heat required for water heating calculated for each month												
180.2344	158.2533	164.7735	145.7288	141.3757	124.2643	117.3830	131.5070	132.1213	151.2093	162.3775	175.2301	175.2301 (62)
WWHRS	-49.8038	-43.8208	-44.7249	-36.7994	-34.1695	-28.1885	-23.8576	-28.8858	-29.7281	-36.7491	-42.5678	-48.1374 eq. (G10)
Total of WWHRS savings												-447.4328
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
							Solar input (sum of months) = Sum (63)m =					0.0000 (63)
Output from w/h												
130.4306	114.4325	120.0486	108.9294	107.2062	96.0758	93.5254	102.6212	102.3932	114.4602	119.8097	127.0927	127.0927 (64)
							Total per year (kWh/year) = Sum (64)m =					1337.0254 (64)
Heat gains from water heating, kWh/month												
70.0428	61.7552	64.9020	58.2434	57.1223	51.1064	49.1447	53.8409	53.7189	60.3919	63.7791	68.3788	68.3788 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	56.2879	49.9944	40.6582	30.7809	23.0090	19.4252	20.9896	27.2831	36.6193	46.4967	54.2685	57.8523 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	362.5737	366.3360	356.8550	336.6709	311.1921	287.2456	271.2479	267.4855	276.9666	297.1507	322.6295	346.5759 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456 (71)
Water heating gains (Table 5)	94.1435	91.8977	87.2339	80.8936	76.7772	70.9812	66.0547	72.3668	74.6096	81.1720	88.5820	91.9070 (72)
Total internal gains	619.6533	614.8764	591.3953	554.9936	517.6266	484.3003	464.9405	473.7838	494.8438	531.4676	572.1283	602.9836 (73)

[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		
North				4.4200	10.6334		0.6800		0.7000		0.7700		15.5037 (74)
East				2.4700	19.6403		0.6800		0.7000		0.7700		16.0024 (76)
South				7.3400	46.7521		0.6800		0.7000		0.7700		113.1976 (78)
West				0.7800	19.6403		0.6800		0.7000		0.7700		5.0534 (80)
North				2.1400	10.6334		0.6800		0.7000		0.7700		7.5063 (74)
Solar gains	157.2633	270.5512	378.7065	485.8553	561.0527	564.8591	541.2788	483.6783	415.4207	301.1780	188.8175	134.3106	(83)
Total gains	776.9166	885.4275	970.1018	1040.8488	1078.6794	1049.1593	1006.2193	957.4621	910.2644	832.6456	760.9458	737.2941	(84)

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	42.7742	43.0357	43.2951	44.5567	44.8010	45.9742	45.9742	46.1983	45.5151	44.8010	44.3096	43.8073
alpha	3.8516	3.8690	3.8863	3.9704	3.9867	4.0649	4.0649	4.0799	4.0343	3.9867	3.9540	3.9205
util living area	0.9923	0.9864	0.9743	0.9431	0.8730	0.7320	0.5741	0.6170	0.8259	0.9537	0.9865	0.9937 (86)
MIT	19.6474	19.8011	20.0424	20.3719	20.6521	20.8529	20.9203	20.9115	20.7799	20.4204	19.9931	19.6445 (87)
Th 2	19.5961	19.6033	19.6104	19.6439	19.6502	19.6796	19.6796	19.6851	19.6682	19.6502	19.6374	19.6242 (88)
util rest of house	0.9896	0.9817	0.9648	0.9205	0.8194	0.6227	0.4182	0.4629	0.7367	0.9306	0.9809	0.9915 (89)
MIT 2	17.8437	18.0714	18.4243	18.9143	19.2908	19.5416	19.5929	19.5942	19.4644	18.9945	18.3764	17.8595 (90)
Living area fraction									fLA = Living area / (4) =			0.3875 (91)
MIT	18.5427	18.7417	19.0513	19.4792	19.8183	20.0498	20.1073	20.1047	19.9742	19.5471	19.0029	18.5513 (92)
Temperature adjustment												0.0000
adjusted MIT	18.5427	18.7417	19.0513	19.4792	19.8183	20.0498	20.1073	20.1047	19.9742	19.5471	19.0029	18.5513 (93)

[illegible]

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

1014.3777	800.8737	687.0054	406.2807	198.6267	0.0000	0.0000	0.0000	0.0000	375.4270	701.8378	1016.6297 (98)
Space heating											5201.0587 (98)
Space heating per m2											(98) / (4) = 56.4596 (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)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	100.0000 (206)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)
Space heating requirement	5201.0587 (211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1014.3777	800.8737	687.0054	406.2807	198.6267	0.0000	0.0000	0.0000	0.0000	375.4270	701.8378	1016.6297	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	1014.3777	800.8737	687.0054	406.2807	198.6267	0.0000	0.0000	0.0000	0.0000	375.4270	701.8378	1016.6297	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	130.4306	114.4325	120.0486	108.9294	107.2062	96.0758	93.5254	102.6212	102.3932	114.4602	119.8097	127.0927	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	130.4306	114.4325	120.0486	108.9294	107.2062	96.0758	93.5254	102.6212	102.3932	114.4602	119.8097	127.0927	(219)
Water heating fuel used												1337.0254	(219)
Annual totals kWh/year													
Space heating fuel - main system												5201.0587	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												397.6246	(232)
Total delivered energy for all uses												6935.7087	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1 (0.00*15.29 + 1.00*5.50)	5201.0587	5.5000	286.0582 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (electric off-peak tariff)			
High-rate fraction			0.1199 (243)
Low-rate fraction			0.8801 (244)
High-rate cost	160.3314	15.2900	24.5147 (245)
Low-rate cost	1176.6940	5.5000	64.7182 (246)
Pumps and fans for heating (0.90*15.29 + 0.10*5.50)	0.0000	0.0000	0.0000 (249)
Energy for lighting (0.90*15.29 + 0.10*5.50)	397.6246	14.3110	56.9041 (250)
Additional standing charges			24.0000 (251)
Total energy cost			456.1951 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.4200 (256)
Energy cost factor (ECF)	1.3973 (257)
SAP value	80.5072
SAP rating (Section 12)	81 (258)
SAP band	B

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	5201.0587	0.5190	2699.3495 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating	1337.0254	0.5190	693.9162 (264)
Space and water heating			3393.2656 (265)
Pumps and fans	0.0000	0.0000	0.0000 (267)
Energy for lighting	397.6246	0.5190	206.3672 (268)
Total kg/year			3599.6328 (272)
CO2 emissions per m2			39.0800 (273)
EI value			64.8227
EI rating			65 (274)
EI band			D

Calculation of stars for heating and DHW

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Main heating energy efficiency	$5.50 \times (1 + 0.29 \times 0.20) / 1.0000 = 5.819$, stars = 3
Main heating environmental impact	$0.519 \times (1 + 0.29 \times 0.20) / 1.0000 = 0.5491$, stars = 2
Water heating energy efficiency	$6.67 / 1.0000 = 6.674$, stars = 4
Water heating environmental impact	$0.519 / 1.0000 = 0.5190$, stars = 3

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	4.6500 (1b)	x 3.1600 (2b)	= 14.6940 (1b) - (3b)
First floor	87.4700 (1c)	x 2.8100 (2c)	= 245.7907 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	92.1200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 260.4847 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 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					2 * 10 = 20.0000 (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) =					20.0000 / (5) = 0.0768 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					0.8268 (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) =	0.5787 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.2000	3.3000	3.5000	3.3000	3.5000	3.5000	3.9000 (22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8000	0.8250	0.8750	0.8250	0.8750	0.8750	0.9750 (22a)
Adj infilt rate	0.6077	0.5787	0.5787	0.5353	0.5353	0.4630	0.4775	0.5064	0.4775	0.5064	0.5064	0.5643 (22b)
Effective ac	0.6846	0.6675	0.6675	0.6433	0.6433	0.6072	0.6140	0.6282	0.6140	0.6282	0.6282	0.6592 (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
External Glazing (Uw = 1.00)			15.0100	0.9615	14.4327		(27)
External door			2.1500	1.0000	2.1500		(26a)
Glazed Door (Uw = 1.00)			2.1400	0.9615	2.0577		(27)
Heat Loss Floor 1			4.6500	0.1700	0.7905		(28a)
External Wall 1	101.9500	17.1500	84.8000	0.1700	14.4160		(29a)
Studwall	17.5400	2.1500	15.3900	0.2107	3.2426		(29a)
External Roof 1	67.4700		67.4700	0.1800	12.1446		(30)
External Roof 2	20.0000		20.0000	0.1100	2.2000		(30)
Total net area of external elements Aum(A, m ²)			211.6100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	51.4341		(33)
Party Wall 1			32.5300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)							31.7415 (36)
Total fabric heat loss						(33) + (36) =	83.1756 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	58.8516	57.3760	57.3760	55.2976	55.2976	52.1934	52.7783	54.0019	52.7783	54.0019	54.0019	56.6652 (38)
Heat transfer coeff	142.0272	140.5516	140.5516	138.4732	138.4732	135.3690	135.9539	137.1775	135.9539	137.1775	137.1775	139.8408 (39)
Average = Sum(39)m / 12 =												138.2272 (39)
HLP	1.5418	1.5257	1.5257	1.5032	1.5032	1.4695	1.4758	1.4891	1.4758	1.4891	1.4891	1.5180 (40)
HLP (average)												1.5005 (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												2.6536 (42)
Average daily hot water use (litres/day)												97.2240 (43)
Daily hot water use	106.9463	103.0574	99.1684	95.2795	91.3905	87.5016	87.5016	91.3905	95.2795	99.1684	103.0574	106.9463 (44)
Energy conte	158.5983	138.7111	143.1375	124.7907	119.7397	103.3262	95.7469	109.8710	111.1832	129.5733	141.4394	153.5940 (45)
Energy content (annual)										Total = Sum(45)m =		1529.7114 (45)
Distribution loss (46)m = 0.15 x (45)m	23.7898	20.8067	21.4706	18.7186	17.9609	15.4989	14.3620	16.4806	16.6775	19.4360	21.2159	23.0391 (46)

Water storage loss:												
Store volume												150.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0084 (51)
Volume factor from Table 2a												0.9283 (52)
Temperature factor from Table 2b												0.6000 (53)
Enter (49) or (54) in (55)												0.6979 (55)
Total storage loss												
	21.6360	19.5422	21.6360	20.9381	21.6360	20.9381	21.6360	21.6360	20.9381	21.6360	20.9381	21.6360 (56)
If cylinder contains dedicated solar storage												
	21.6360	19.5422	21.6360	20.9381	21.6360	20.9381	21.6360	20.9381	21.6360	20.9381	21.6360 (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 (59)	
Total heat required for water heating calculated for each month												
	180.2344	158.2533	164.7735	145.7288	141.3757	124.2643	117.3830	131.5070	132.1213	151.2093	162.3775	175.2301 (62)
WWHRS	-49.8038	-43.8208	-44.7249	-36.7994	-34.1695	-28.1885	-23.8576	-28.8858	-29.7281	-36.7491	-42.5678	-48.1374 eq.(G10)
Total of WWHRS savings												-447.4328
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)	
								Solar input	(sum of months) =	Sum(63)m =		0.0000 (63)
Output from w/h	130.4306	114.4325	120.0486	108.9294	107.2062	96.0758	93.5254	102.6212	102.3932	114.4602	119.8097	127.0927 (64)
								Total per year (kWh/year) =	Sum(64)m =			1337.0254 (64)
Heat gains from water heating, kWh/month												
	70.0428	61.7552	64.9020	58.2434	57.1223	51.1064	49.1447	53.8409	53.7189	60.3919	63.7791	68.3788 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184	159.2184 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	56.2879	49.9944	40.6582	30.7809	23.0090	19.4252	20.9896	27.2831	36.6193	46.4967	54.2685	57.8523 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	362.5737	366.3360	356.8550	336.6709	311.1921	287.2456	271.2479	267.4855	276.9666	297.1507	322.6295	346.5759 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755	53.5755 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456	-106.1456 (71)
Water heating gains (Table 5)	94.1435	91.8977	87.2339	80.8936	76.7772	70.9812	66.0547	72.3668	74.6096	81.1720	88.5820	91.9070 (72)
Total internal gains	619.6533	614.8764	591.3953	554.9936	517.6266	484.3003	464.9405	473.7838	494.8438	531.4676	572.1283	602.9836 (73)

[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	4.4200	11.9672	0.6800	0.7000	0.7700	17.4484 (74)
East	2.4700	22.3142	0.6800	0.7000	0.7700	18.1810 (76)
South	7.3400	50.8329	0.6800	0.7000	0.7700	123.0781 (78)
West	0.7800	22.3142	0.6800	0.7000	0.7700	5.7414 (80)
North	2.1400	11.9672	0.6800	0.7000	0.7700	8.4479 (74)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	45.0422	45.5151	45.5151	46.1983	46.1983	47.2576	47.0544	46.6346	47.0544	46.6346	46.6346	45.7465
alpha	4.0028	4.0343	4.0343	4.0799	4.0799	4.1505	4.1370	4.1090	4.1370	4.1090	4.1090	4.0498
util living area	0.9887	0.9823	0.9637	0.9073	0.7800	0.5280	0.2990	0.3276	0.6766	0.9133	0.9771	0.9907 (86)
MIT	19.8882	20.0132	20.2546	20.5713	20.8114	20.9298	20.9465	20.9455	20.8939	20.6271	20.2298	19.8785 (87)
Th 2	19.6563	19.6682	19.6682	19.6851	19.6851	19.7105	19.7057	19.6957	19.7057	19.6957	19.6957	19.6740 (88)
util rest of house	0.9845	0.9758	0.9494	0.8693	0.6902	0.3838	0.1314	0.1506	0.5396	0.8682	0.9670	0.9872 (89)
MIT 2	18.2370	18.4259	18.7706	19.2169	19.5055	19.6283	19.6290	19.6184	19.6033	19.3076	18.7599	18.2361 (90)
Living area fraction	18.2370	18.4259	18.7706	19.2169	19.5055	19.6283	19.6290	19.6184	19.6033	19.3076	18.7599	18.2361 (90)
MIT	18.8769	19.0410	19.3457	19.7418	20.0116	20.1326	20.1396	20.1327	20.1034	19.8189	19.3296	18.8726 (91)
Temperature adjustment												0.0000
adjusted MIT	18.8769	19.0410	19.3457	19.7418	20.0116	20.1326	20.1396	20.1327	20.1034	19.8189	19.3296	18.8726 (93)

[illegible]

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Space heating	813.7842	642.6470	514.4571	254.7142	81.3763	0.0000	0.0000	0.0000	0.0000	214.8847	515.4011	821.8285 (98)
Space heating per m2												3859.0931 (98)
											(98) / (4) =	41.8920 (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)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												100.0000 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement												3859.0931 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	813.7842	642.6470	514.4571	254.7142	81.3763	0.0000	0.0000	0.0000	0.0000	214.8847	515.4011	821.8285 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	813.7842	642.6470	514.4571	254.7142	81.3763	0.0000	0.0000	0.0000	0.0000	214.8847	515.4011	821.8285 (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	130.4306	114.4325	120.0486	108.9294	107.2062	96.0758	93.5254	102.6212	102.3932	114.4602	119.8097	127.0927 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	130.4306	114.4325	120.0486	108.9294	107.2062	96.0758	93.5254	102.6212	102.3932	114.4602	119.8097	127.0927 (219)
Water heating fuel used												1337.0254 (219)
Annual totals kWh/year												
Space heating fuel - main system												3859.0931 (211)
Space heating fuel - secondary												0.0000 (215)
Electricity for pumps and fans:												
Total electricity for the above, kWh/year												0.0000 (231)
Electricity for lighting (calculated in Appendix L)												397.6246 (232)
Total delivered energy for all uses												5593.7431 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel	Fuel price	Fuel cost
	kWh/year	p/kWh	£/year
Space heating - main system 1 (0.00*35.09 + 1.00*14.87)	3859.0931	14.8700	573.8471 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (electric off-peak tariff)			
High-rate fraction			0.1199 (243)
Low-rate fraction			0.8801 (244)
High-rate cost	160.3314	35.0900	56.2603 (245)
Low-rate cost	1176.6940	14.8700	174.9744 (246)
Pumps and fans for heating (0.90*35.09 + 0.10*14.87)	0.0000	0.0000	0.0000 (249)
Energy for lighting (0.90*35.09 + 0.10*14.87)	397.6246	33.0680	131.4865 (250)
Additional standing charges			0.0000 (251)
Total energy cost			936.5683 (255)

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

	Energy	Emission factor	Emissions
	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	3859.0931	0.5190	2002.8693 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating	1337.0254	0.5190	693.9162 (264)
Space and water heating			2696.7855 (265)
Pumps and fans	0.0000	0.0000	0.0000 (267)
Energy for lighting	397.6246	0.5190	206.3672 (268)
Total kg/year			2903.1527 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy	Primary energy factor	Primary energy
	kWh/year	kg CO2/kWh	kWh/year
Space heating - main system 1	3859.0931	3.0700	11847.4158 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating	1337.0254	3.0700	4104.6679 (264)
Space and water heating			15952.0838 (265)
Pumps and fans	0.0000	0.0000	0.0000 (267)
Energy for lighting	397.6246	3.0700	1220.7076 (268)
Primary energy kWh/year			17172.7914 (272)
Primary energy kWh/m2/year			186.4176 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 81
Current environmental impact rating: D 65

(For testing purposes):	
A	Not considered
B	Not considered
C	Not considered
D	Not considered
E Low energy lighting	Already installed
F	Not considered
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N Solar water heating	Not applicable
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Not applicable
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
	Total Savings £0		0.00 kg/m²

Potential energy efficiency rating: B 81
Potential environmental impact rating: D 65

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Thames Valley):

Electricity	Current £937	Potential £937	Saving £0
Space heating	£574	£574	£0
Water heating	£231	£231	£0
Lighting	£131	£131	£0
Total cost of fuels	£937	£937	£0
Total cost of uses	£936	£936	£0
Delivered energy	61 kWh/m²	61 kWh/m²	0 kWh/m²
Carbon dioxide emissions	2.9 tonnes	2.9 tonnes	0.0 tonnes
CO2 emissions per m²	32 kg/m²	32 kg/m²	0 kg/m²
Primary energy	186 kWh/m²	186 kWh/m²	0 kWh/m²

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

U-VALUE CALCULATOR REPORT

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Project	2, Belford House, 53 Hampton Road, Forest Gate, E7 0PD		
Calculation Type	Conversion (As Designed)		

SAP Rating	81 B	DER	N/A	TER	N/A
Environmental	65 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.90	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk	Assessor ID	D226-0001
Client	Cheryl Simmonds, Forest Gate		

Building Elements

Roof 000005 - pitched roof - insulated slope, sloping

Roof Type: Pitched Roof, insulated sloping ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.1000	
Layer 1	Tiles, clay				
	Main construction	15	1.0000	0.0000	100.00
Layer 2	Air layer ventilated				
	Main construction	50	0.0000	0.0000	87.50
	Main construction	50	0.1300	0.0000	12.50
	Corrections - Cavity Ventilated, Emissivity: Normal				
Layer 3	Sarking Felt				
	Main construction	1	0.2300	0.0043	100.00
Layer 4	Insulation Board / Rafters				
	Main construction	170	0.0200	8.5000	88.38
	Main construction	170	0.1300	1.3077	11.62
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 5	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 6	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = 5.736 m² K/W Lower limit = 5.458 m² K/W Average = 5.597 m² K/W
Total correction = 0.0000 m² K/W U-value (unrounded) = 0.18 W/m² K

Unheated space: None

Total thickness: 252 mm

U-value: 0.18 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Project	2, Belford House, 53 Hampton Road, Forest Gate, E7 0PD		
Calculation Type	Conversion (As Designed)		

SAP Rating	81 B	DER	N/A	TER	N/A
Environmental	65 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.90	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk	Assessor ID	D226-0001
Client	Cheryl Simmonds, Forest Gate		

Building Elements

Roof 000003 - Flat roof insulation between timber joists

Roof Type: Flat Roof standard (no precipitation)

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Felt				
	Main construction	7	0.0300	0.2333	100.00
Layer 2	Plywood				
	Main construction	22	0.1300	0.1692	100.00
Layer 3	airspace/timber battens				
	Main construction	22	0.1222	0.1800	89.63
	Main construction	22	0.1375	0.1600	10.37
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 4	Sarking felt				
	Main construction	0.5	0.2300	0.0022	100.00
Layer 5	Thermarroof TR27 (*80mm-119mm)				
	Main construction	110	0.0250	4.4000	91.67
	Main construction	110	0.1300	0.8462	8.33
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 6	Thermarroof TR27 (120mm +)				
	Main construction	130	0.0240	5.4167	97.50
	Main construction	130	0.1300	1.0000	2.50
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 7	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	97.50
	Main construction	12.5	0.1300	0.0962	2.50
Layer 8	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = 9.973 m² K/W Lower limit = 8.927 m² K/W Average = 9.450 m² K/W
Total correction = 0.0039 m² K/W U-value (unrounded) = 0.11 W/m² K

Unheated space: None

Total thickness: 307 mm

U-value: 0.11 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Project	2, Belford House, 53 Hampton Road, Forest Gate, E7 OPD		
Calculation Type	Conversion (As Designed)		

SAP Rating	81 B	DER	N/A	TER	N/A
Environmental	65 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.90	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk	Assessor ID	D226-0001
Client	Cheryl Simmonds, Forest Gate		

Building Elements

Wall 000001 - Masonry solid wall

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Brick, outer leaf				
	Main construction	110	0.7700	0.1429	82.81
	Main construction	110	0.9407	0.1169	17.19
Layer 2	Brick, inner leaf				
	Main construction	110	0.5600	0.1964	82.81
	Main construction	110	0.8803	0.1250	17.19
Layer 3	Celotex GA4000				
	Main construction	100	0.0220	4.5455	88.38
	Main construction	100	0.1300	0.7692	11.62
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 4	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 5	Kooltherm K17 Insulated Plasterboard (52.5mm)				
	Main construction	52.5	0.0269	1.9500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 6	Plaster, standard				
	Main construction	5	0.4000	0.0125	100.00
Int surface				0.1300	

Total resistance:	Upper limit = 6.228 m ² K/W	Lower limit = 5.403 m ² K/W	Average = 5.816 m ² K/W
	Total correction = 0.0011 m ² K/W	U-value (unrounded) = 0.17 W/m ² K	

Unheated space: None

Total thickness: 390 mm

U-value: 0.17 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Project	2, Belford House, 53 Hampton Road, Forest Gate, E7 0PD		
Calculation Type	Conversion (As Designed)		

SAP Rating	81 B	DER	N/A	TER	N/A
Environmental	65 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.90	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk	Assessor ID	D226-0001
Client	Cheryl Simmonds, Forest Gate		

Building Elements

Wall 000002 - Timber Framed warm frame or hybrid

Wall Type: Timber framed Wall with I-beams

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Plaster, lightweight - Insulating				
	Main construction	15	0.1800	0.0833	100.00
Layer 2	Gyproc Wallboard (12.5mm)				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Plywood				
	Main construction	22	0.1300	0.1692	100.00
Layer 4	Breather membrane				
	Main construction	1	0.0000	0.0000	100.00
Layer 5	Kooltherm K12 Frame board (45mm +)				
	Main construction	100	0.0200	5.0000	89.12
	Main construction	100	0.1300	0.7692	10.88
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 6	Vapour control layer				
	Main construction	1	0.0000	0.0000	100.00
Layer 7	Plasterboard,				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 8	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1300	

Total resistance:	Upper limit = 4.123 m ² K/W	Lower limit = 3.684 m ² K/W	Average = 3.903 m ² K/W
	Total correction = 0.0064 m ² K/W	U-value (unrounded) = 0.26 W/m ² K	

Unheated space: None

Total thickness: 167 mm

U-value: 0.26 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Project	2, Belford House, 53 Hampton Road, Forest Gate, E7 OPD		
Calculation Type	Conversion (As Designed)		

SAP Rating	81 B	DER	N/A	TER	N/A
Environmental	65 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.90	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk	Assessor ID	D226-0001
Client	Cheryl Simmonds, Forest Gate		

Building Elements

Floor 000004 - floor- suspended timber floor

Floor Type: Suspended Floor

Area = 4.65 m², Perimeter = 6.60 m, Wall thickness = 300.00 mm, Soil: Clay

Depth of underfloor space below ground: 0.200 m Floor wind shielding: Average (suburban)

Floor height above ground: h = 0.200 m

U-value of walls above ground: U_w = 1.500 m

Ventilation openings per perimeter length: e = 0.0015 %

Mean wind speed: v = 5.000 m/s

Resistance on solum: R_g = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	Isulation/joists				
	Main construction	200	0.0400	5.0000	90.91
	Main construction	200	0.1300	1.5385	9.09
Layer 2	Chipboard				
	Main construction	22	0.1300	0.1692	100.00
Layer 3	Underlay, wool				
	Main construction	20	0.0600	0.3333	100.00
Layer 4	Woodblock				
	Main construction	35	0.1300	0.2692	100.00
Int surface				0.1700	

Total resistance: Upper limit = 5.463 m² K/W Lower limit = 5.263 m² K/W Average = 5.363 m² K/W

Total correction = 0.0000 m² K/W

U-value (unrounded) = 0.17 W/m² K

Unheated space: None

Total thickness: 277 mm

U-value: 0.17 W/m² K

Kappa: n/a

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	000010	Issued on Date	26/08/2024
Assessment Reference	001	Prop Type Ref	Forest Gate Part L1b
Property	2, Belford House, 53 Hampton Road, Forest Gate, E7 OPD		
SAP Rating	81 B	DER	N/A
Environmental	65 D	% DER<TER	N/A
CO ₂ Emissions (t/year)	2.90	DFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A
Assessor Details	Mr. Iftikhar Ahmed, Iftikhar Ahmed, Tel: 01706 662 700, ifty@energynational.co.uk		Assessor ID
Client	Cheryl Simmonds, Forest Gate		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	East				
Property Tenure	Unknown				
Transaction Type	New dwelling				
Terrain Type	Suburban				
1.0 Property Type	Maisonette, Semi-Detached				
2.0 Number of Storeys	2				
3.0 Date Built	2022				
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:	6.60 m	4.65 m ²	3.16 m	
	1st Storey:	34.99 m	87.47 m ²	2.81 m	
7.0 Living Area	35.70		m ²		
8.0 Thermal Mass Parameter	Simple calculation - Medium				
Thermal Mass	250.00		kJ/m ² K		
9.0 External Walls					
Description	Type		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall		0.17	101.95	84.80
Studwall	Timber Frame		0.26	17.54	15.39
9.1 Party Walls					
Description	Type	Construction		U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing			0.00	32.53
10.0 External Roofs					
Description	Type		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Plane Roof		0.18	67.47	67.47
External Roof 2	External Flat Roof		0.11	20.00	20.00
11.0 Heat Loss Floors					

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Type	Construction	U-Value (W/m²K)	Area (m²)
Heat Loss Floor 1	Ground Floor - Timber		0.17	4.65

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
External Glazing	Manufacturer	Window	Triple glazed			0.68		0.70	1.00
External door	Manufacturer	Half Glazed Door	Triple glazed			0.68		0.70	1.00
Glazed Door	Manufacturer	Window	Triple glazed			0.68		0.70	1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Opening 1	Window	[1] External Wall 1	East	Dark-coloured venetian blind	0.00					1.69	1
Opening 2	Window	[1] External Wall 1	North	Dark-coloured venetian blind	0.00					1.11	1
Opening 3	Window	[1] External Wall 1	North	Dark-coloured venetian blind	0.00					1.01	1
Opening 4	Window	[1] External Wall 1	North	Dark-coloured venetian blind	0.00					2.30	1
Opening 5	Window	[1] External Wall 1	North	Dark-coloured venetian blind	0.00					2.14	0
Opening 6	Half Glazed Door	[2] Studwall	East							2.15	
Opening 7	Window	[1] External Wall 1	East	Dark-coloured venetian blind	0.00					0.78	1
Opening 8	Window	[1] External Wall 1	South	Dark-coloured venetian blind	0.00					1.60	1
Opening 9	Window	[1] External Wall 1	South	Dark-coloured venetian blind	0.00					2.22	1
Opening 10	Window	[1] External Wall 1	South	Dark-coloured venetian blind	0.00					1.76	1
Opening 11	Window	[1] External Wall 1	South	Dark-coloured venetian blind	0.00					1.76	1
Opening 12	Window	[1] External Wall 1	West	Dark-coloured venetian blind	0.00					0.78	1

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

17.0 Thermal Bridging W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather
 Cross ventilation possible
 Night Ventilation
 Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				2
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 (SAP Table) %
 Controls
 Sap Code

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

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

28.2 Waste Water Heat Recovery System

Total rooms with shower and/or bath	1
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Instantaneous System 1

Database ID	80070
Brand Model	Power-pipe, C4-120
Details	Year: 2011 + current Efficiency: 67.6 Utilisation factor: 0.862
Number of mixer showers in rooms with a bath	1
Number of mixer showers in rooms without a bath	0

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Foam
Insulation Thickness	160 mm
Cylinder Volume	150.00 L

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None