elmhurst energy

SAP Report Submission for Building Regulations Compliance

Client:

Project: Abbey Road Retail Park
Barking

Contact: Heidi Pateman
Heidi Pateman
heidi@sestesting.com

Report Issue Date: 24/02/2022

EXCELLENCE IN ENERGY ASSESSMENT

PREDICTED ENERGY ASSESSMENT

Design SAP
elmhurst energy

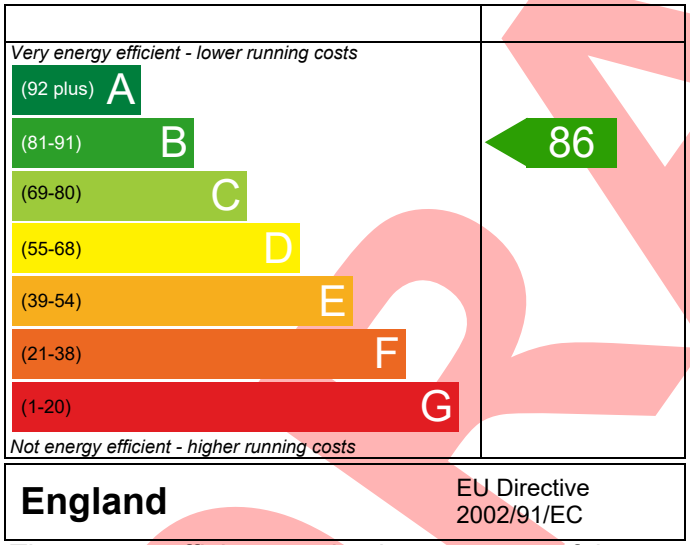
Abbey Road Retail Park,
Barking

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	24/02/2022
Produced by:	Heidi Pateman
Total floor area:	54.74 m²

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

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

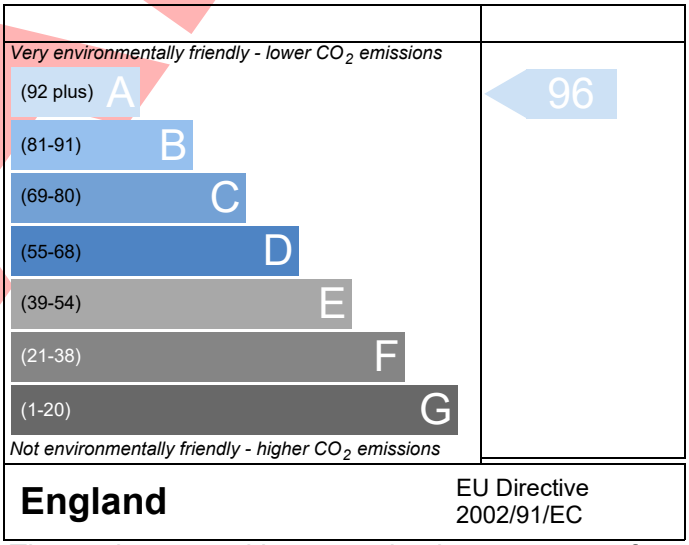
Energy Efficiency Rating



England EU Directive 2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



England EU Directive 2002/91/EC

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

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

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

Design SAP
elmhurst energy

Property Reference	WH190 Plot 448	**Issued on Date**	24/02/2022
Assessment Reference	Plot 448	**Prop Type Ref**	Flat Type B1N-10
Property	Abbey Road Retail Park, Barking		

SAP Rating	86 B	**DER**	7.26	**TER**	14.90
Environmental	96 A	**% DER<TER**	51.27		
CO_2 Emissions (t/year)	0.32	**DFEE**	21.76	**TFEE**	24.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	10.69		

Assessor Details	Mr. Paul Pasifull, Stansted Environmental Services, Tel: 01277225709, paul@sestesting.com	**Assessor ID**	P722-0001
Client			

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas (c)		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	14.90	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	7.26	$kgCO_2/m^2$	Pass
	-7.64 (-51.3%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	24.37	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	21.76	$kWh/m^2/yr$	
	-2.6 (-10.7%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.27 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.40 (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	3.00 (design value)	$m^3/(h.m^2)$ @ 50 Pa	
Maximum	10.0	$m^3/(h.m^2)$ @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Community heating scheme	-
Secondary heating system	None	

5 Cylinder insulation

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

Hot water storage	Measured cylinder loss: 0.40 kWh/day Permitted by DBSCG 0.50		Pass
Primary pipework insulated	No primary pipework		
6 Controls			
Space heating controls	Charging system linked to use of community heating, programmer and at least two room stats		Pass
Hot water controls	No cylinderstat		
7 Low energy lights			
Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass
8 Mechanical ventilation			
Continuous extract system			
Specific fan power	0.14		
Maximum	0.7		Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant		Pass
Based on:			
Overshading	Average		
Windows facing East	2.39 m², No overhang		
Air change rate	4.00 ach		
Blinds/curtains	None		

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

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

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	m³/(h.m²) @ 50 Pa	
Maximum	10.0	m³/(h.m²) @ 50 Pa	Pass

10 Key features

External wall U-value	0.14	W/m²K
External wall U-value	0.14	W/m²K
Party wall U-value	0.00	W/m²K
Party wall U-value	0.00	W/m²K
Air permeability	3.0	m³/m²h
Community CHP, Mains gas	N/A	
Photovoltaic array	265.00	kWh/Year

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

	Typical cost	Typical savings per year	Energy efficiency	Environmental impact	Result
Low energy lights			0	0	Already installed
Solar water heating			0	0	Not applicable
Photovoltaic			0	0	Not applicable
Wind turbine			0	0	Not applicable
Totals	**£0**	**£0**	**B 86**	**A 96**	

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

THERMAL BRIDGING
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	WH190 Plot 448	**Issued on Date**	24/02/2022
Assessment Reference	Plot 448	**Prop Type Ref**	Flat Type B1N-10
Property	Abbey Road Retail Park, Barking		

SAP Rating	86 B	**DER**	7.26	**TER**	14.90
Environmental	96 A	**% DER<TER**	51.27		
CO_2 Emissions (t/year)	0.32	**DFEE**	21.76	**TFEE**	24.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	10.69		

Assessor Details	Mr. Paul Pasifull, Stansted Environmental Services, Tel: 01277225709, paul@sestesting.com	**Assessor ID**	P722-0001
Client			

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Table K1 - Approved	0.300	4.30	1.29	
External wall	E4 Jamb	Table K1 - Approved	0.050	8.44	0.42	
External wall	E7 Party floor between dwellings (in blocks of flats)	Table K1 - Approved	0.070	8.77	0.61	
External wall	E7 Party floor between dwellings (in blocks of flats)	Table K1 - Approved	0.070	8.77	0.61	
External wall	E18 Party wall between dwellings	Table K1 - Approved	0.060	2.68	0.16	
External wall	E25 Staggered party wall between dwellings	Table K1 - Default	0.120	2.68	0.32	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	24.75	0.00	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	24.75	0.00	

Total: 3.42 **W/mK:**

Y-Value: 0.135 **W/m²K:**

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

Design SAP
elmhurst energy

Property Reference	WH190 Plot 448	**Issued on Date**	24/02/2022
Assessment Reference	Plot 448	**Prop Type Ref**	Flat Type B1N-10
Property	Abbey Road Retail Park, Barking		

SAP Rating	86 B	**DER**	7.26	**TER**	14.90
Environmental	96 A	**% DER<TER**	51.27		
CO_2 Emissions (t/year)	0.32	**DFEE**	21.76	**TFEE**	24.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	10.69		

Assessor Details	Mr. Paul Pasifull, Stansted Environmental Services, Tel: 01277225709, paul@sestesting.com	**Assessor ID**	P722-0001
Client			

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

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

DWELLING AS DESIGNED

Mid-floor flat, total floor area 55 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 (c)
Fuel factor:1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 14.90 kgCO□/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.26 kgCO□/m²OK

1b TFEE and DFEE
Target Fabric Energy Efficiency (TFEE)24.4 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)21.8 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.27 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	(no roof)		
Openings	1.40 (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: 3.00 (design value)
Maximum 10.0 OK

4 Heating efficiency
Main heating system: Community heating scheme -

Secondary heating system: None

5 Cylinder insulation
Hot water storage Measured cylinder loss: 0.40 kWh/day
Permitted by DBSCG 0.50 OK
Primary pipework insulated: No primary pipework

6 Controls
Space heating controls: Charging system linked to use of community heating, programmer and at least two room statsOK

Hot water controls: No cylinderstat

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

8 Mechanical ventilation
Continuous extract system
Specific fan power: 0.14
Maximum 0.7 OK

9 Summertime temperature
Overheating risk (Thames Valley): Not significant OK
Based on:
Overshading: Average
Windows facing East: 2.39 m², No overhang
Air change rate: 4.00 ach
Blinds/curtains: None

10 Key features
External wall U-value 0.14 W/m²K
External wall U-value 0.14 W/m²K
Party wall U-value 0.00 W/m²K
Party wall U-value 0.00 W/m²K
Air permeability 3.0 m³/m²h
Community CHP, Mains gas
Photovoltaic array 265.00 kWh/Year

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.7400 (1b)	x	2.5000 (2b)	=	136.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.7400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	136.8500	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000	(8)
Pressure test		Yes	
Measured/design AP50		3.0000	
Infiltration rate		0.1500	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275	(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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498	(22b)
Mechanical extract ventilation - centralised													
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	
Windows (Uw = 1.40)			2.3900	1.3258	3.1686			(27)
2. Column wall	8.1400		8.1400	0.2700	2.1978	150.0000	1221.0000	(29a)
3. Uni panel cladding	5.0500	2.3900	2.6600	0.1400	0.3724	14.0000	37.2400	(29a)
1. Uni panel brick	12.1200		12.1200	0.1400	1.6968	14.0000	169.6800	(29a)
Total net area of external elements Aum(A, m2)			25.3100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		7.4356			(33)
Party Wall 1			52.1000	0.0000	0.0000	180.0000	9378.0000	(32)
Party Wall 2			26.2200	0.0000	0.0000	70.0000	1835.4000	(32)
Party Floor			54.7400			40.0000	2189.6000	(32d)
Party Ceilings			54.7400			40.0000	2189.6000	(32b)
Internal Wall - SFS			78.0000			9.0000	702.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17722.5200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		323.7581 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		3.4222 (36)
Total fabric heat loss	(33) + (36) =	10.8578 (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	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	22.5803	(38)
Heat transfer coeff	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	33.4380	(39)
Average = Sum(39)m / 12 =												33.4380	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	0.6109	(40)
HLP (average)												0.6109	(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		1.8297 (42)
Average daily hot water use (litres/day)		77.6563 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	85.4219	82.3156	79.2094	76.1031	72.9969	69.8906	69.8906	72.9969	76.1031	79.2094	82.3156	85.4219	(44)
Energy conte	126.6782	110.7935	114.3290	99.6748	95.6404	82.5304	76.4765	87.7579	88.8060	103.4948	112.9727	122.6811	(45)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Energy content (annual)											Total = Sum(45)m =	1221.8353	(45)
Distribution loss (46)m = 0.15 x (45)m													
	19.0017	16.6190	17.1494	14.9512	14.3461	12.3796	11.4715	13.1637	13.3209	15.5242	16.9459	18.4022	(46)
Water storage loss:													
Store volume												10.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.4000	(48)
Temperature factor from Table 2b												1.0000	(49)
Enter (49) or (54) in (55)												0.4000	(55)
Total storage loss													
	12.4000	11.2000	12.4000	12.0000	12.4000	12.0000	12.4000	12.4000	12.0000	12.4000	12.0000	12.4000	(56)
If cylinder contains dedicated solar storage													
	12.4000	11.2000	12.4000	12.0000	12.4000	12.0000	12.4000	12.4000	12.0000	12.4000	12.0000	12.4000	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Total heat required for water heating calculated for each month													
	162.3406	143.0047	149.9914	134.1868	131.3028	117.0424	112.1389	123.4203	123.3180	139.1572	147.4847	158.3435	(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													
	162.3406	143.0047	149.9914	134.1868	131.3028	117.0424	112.1389	123.4203	123.3180	139.1572	147.4847	158.3435	(64)
										Total per year (kWh/year) = Sum(64)m =		1641.7313	(64)
Heat gains from water heating, kWh/month													
	70.6504	62.6078	66.5443	60.7515	60.3303	55.0509	53.9584	57.7094	57.1376	62.9420	65.1730	69.3214	(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	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.7963	16.6947	13.5770	10.2787	7.6834	6.4867	7.0091	9.1107	12.2283	15.5267	18.1219	19.3187	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	159.5153	161.1706	156.9994	148.1193	136.9098	126.3745	119.3363	117.6810	121.8522	130.7323	141.9418	152.4771	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	(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)													
	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	(71)
Water heating gains (Table 5)													
	94.9602	93.1664	89.4413	84.3770	81.0892	76.4596	72.5247	77.5664	79.3578	84.5994	90.5181	93.1739	(72)
Total internal gains													
	323.7179	321.4777	310.4637	293.2211	276.1285	259.7669	249.3161	254.8042	263.8844	281.3044	301.0278	315.4157	(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	
East	2.3900	19.6403	0.4200	0.7000	0.7700	9.5637	(76)

Solar gains	9.5637	18.7086	30.8104	44.9352	55.0697	56.3737	53.6700	46.1018	35.8338	22.1994	11.9248	7.8647	(83)
Total gains	333.2816	340.1863	341.2742	338.1563	331.1983	316.1406	302.9862	300.9060	299.7182	303.5038	312.9527	323.2804	(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	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	147.2253	
alpha	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	10.8150	
util living area													
	0.9985	0.9974	0.9933	0.9732	0.8837	0.6737	0.4855	0.5110	0.7588	0.9635	0.9954	0.9989	(86)
MIT	20.6589	20.6991	20.7795	20.8859	20.9723	20.9984	21.0000	20.9999	20.9950	20.9164	20.7683	20.6390	(87)
Th 2	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	20.4202	(88)
util rest of house													
	0.9979	0.9964	0.9905	0.9620	0.8463	0.6144	0.4216	0.4467	0.7003	0.9466	0.9934	0.9985	(89)
MIT 2	19.9632	20.0217	20.1381	20.2876	20.3952	20.4194	20.4202	20.4202	20.4170	20.3293	20.1224	19.9341	(90)
Living area fraction										fLA = Living area / (4) =		0.5612	(91)
MIT	20.3536	20.4019	20.4980	20.6233	20.7191	20.7443	20.7456	20.7455	20.7414	20.6588	20.4849	20.3297	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.3536	20.4019	20.4980	20.6233	20.7191	20.7443	20.7456	20.7455	20.7414	20.6588	20.4849	20.3297	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9978	0.9964	0.9909	0.9663	0.8664	0.6477	0.4575	0.4828	0.7332	0.9543	0.9936	0.9984	(94)
Useful gains	332.5497	338.9482	338.1657	326.7739	286.9529	204.7702	138.6036	145.2778	219.7613	289.6272	310.9588	322.7684	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	536.8016	518.3523	468.0667	392.0054	301.5807	205.4548	138.6196	145.3064	222.0755	336.3454	447.5643	539.3449	(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													
	151.9634	120.5595	96.6463	46.9667	10.8831	0.0000	0.0000	0.0000	0.0000	34.7584	98.3560	161.1329	(98)
Space heating												721.2663	(98)
Space heating per m2											(98) / (4) =	13.1762	(99)

8c. Space cooling requirement

Not applicable

9b. Energy requirements

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(301)
Fraction of space heat from community system	1.0000	(302)
Fraction of heat from community Boilers	0.1740	(303a)
Fraction of heat from community Combined Heat and Power	0.8260	(303b)
Fraction of total space heat from community Boilers	0.1740	(304a)
Fraction of total space heat from community Combined Heat and Power	0.8260	(304b)
Factor for control and charging method (Table 4c(3)) for community space heating	1.0000	(305)
Factor for control and charging method (Table 4c(3)) for community water heating	1.0000	(305a)
Distribution loss factor (Table 12c) for community heating system	1.0500	(306)
Space heating:		
Annual space heating requirement	721.2663	(98)
Space heat from Boilers = (98) x 0.17 x 1.00 x 1.05	131.7754	(307a)
Space heat from Combined Heat and Power = (98) x 0.83 x 1.00 x 1.05	625.5543	(307b)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)	0.0000	(308)
Space heating fuel for secondary/supplementary system	0.0000	(309)
Water heating		
Annual water heating requirement	1641.7313	(64)
Water heat from Boilers = (64) x 0.17 x 1.00 x 1.05	299.9443	(310a)
Water heat from Combined Heat and Power = (64) x 0.83 x 1.00 x 1.05	1423.8736	(310b)
Electricity used for heat distribution	24.8115	(313)
Annual totals kWh/year		
Electricity for pumps and fans:		
(MEVCentralised, Database: in-use factor = 1.3000, SFP = 0.1820)		
mechanical ventilation fans (SFP = 0.1820)	30.3862	(330a)
Total electricity for the above, kWh/year	30.3862	(331)
Electricity for lighting (calculated in Appendix L)	331.9482	(332)
Energy saving/generation technologies (Appendices M ,N and Q)		
Total delivered energy for all uses	2843.4819	(338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Efficiency of heat source Boilers			91.4000	(367a)
Space heating from Boilers	472.3410	0.2160	102.0257	(367)
Electrical efficiency of CHP unit			33.2000	(361)
Heat efficiency of CHP unit			38.6000	(362)
Space heating from Combined Heat and Power	1620.6069	0.2160	350.0511	(363)
less credit emissions for electricity	-538.0415	0.5190	-279.2435	(364)
Water heating from Combined Heat and Power	3688.7916	0.2160	796.7790	(365)
less credit emissions for electricity	-1224.6788	0.5190	-635.6083	(366)
Electrical energy for heat distribution	24.8115	0.5190	12.8772	(372)
Total CO2 associated with community systems			346.8810	(373)
(negative value allowed since DFEE <= TFEE)				
Space and water heating			346.8810	(376)
Pumps and fans	30.3862	0.5190	15.7704	(378)
Energy for lighting	331.9482	0.5190	172.2811	(379)
Energy saving/generation technologies				
PV Unit	-265.0000	0.5190	-137.5350	(380)
Total CO2, kg/year			397.3976	(383)
Dwelling Carbon Dioxide Emission Rate (DER)			7.2600	(384)

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

DER		7.2600	ZC1
Total Floor Area	TFA	54.7400	
Assumed number of occupants	N	1.8297	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		17.2681	ZC2
CO2 emissions from cooking, equation (L16)		2.9761	ZC3
Total CO2 emissions		27.5042	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		27.5042	ZC8

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.7400 (1b)	x	2.5000 (2b)	=	136.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.7400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	136.8500	(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) =	0.1461	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.3961	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3367	(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	0.4293	0.4209	0.4125	0.3704	0.3620	0.3199	0.3199	0.3115	0.3367	0.3620	0.3788	0.3957	(22b)
Effective ac	0.5922	0.5886	0.5851	0.5686	0.5655	0.5512	0.5512	0.5485	0.5567	0.5655	0.5718	0.5783	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opening Type (Uw = 1.40)			2.3900	1.3258	3.1686			(27)
2. Column wall	8.1400		8.1400	0.1800	1.4652			(29a)
3. Uni panel cladding	5.0500	2.3900	2.6600	0.1800	0.4788			(29a)
1. Uni panel brick	12.1200		12.1200	0.1800	2.1816			(29a)
Total net area of external elements Aum(A, m2)			25.3100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		7.2942			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	2.1864	(36)
Total fabric heat loss (33) + (36) =	9.4806	(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	26.7422	26.5806	26.4222	25.6781	25.5389	24.8908	24.8908	24.7708	25.1405	25.5389	25.8205	26.1149	(38)
Heat transfer coeff	36.2228	36.0611	35.9027	35.1587	35.0195	34.3714	34.3714	34.2514	34.6210	35.0195	35.3011	35.5955	(39)
Average = Sum(39)m / 12 =												35.1580	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.6617	0.6588	0.6559	0.6423	0.6397	0.6279	0.6279	0.6257	0.6325	0.6397	0.6449	0.6503	(40)
HLP (average)												0.6423	(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	1.8297 (42)
Average daily hot water use (litres/day)	77.6563 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	85.4219	82.3156	79.2094	76.1031	72.9969	69.8906	69.8906	72.9969	76.1031	79.2094	82.3156	85.4219	(44)
Energy conte	126.6782	110.7935	114.3290	99.6748	95.6404	82.5304	76.4765	87.7579	88.8060	103.4948	112.9727	122.6811	(45)
Energy content (annual)										Total = Sum(45)m =		1221.8353	(45)
Distribution loss (46)m = 0.15 x (45)m	19.0017	16.6190	17.1494	14.9512	14.3461	12.3796	11.4715	13.1637	13.3209	15.5242	16.9459	18.4022	(46)

Water storage loss:	
Store volume	10.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	0.3712 (48)
Temperature factor from Table 2b	0.5400 (49)
Enter (49) or (54) in (55)	0.2005 (55)
Total storage loss	

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

	6.2141	5.6127	6.2141	6.0136	6.2141	6.0136	6.2141	6.2141	6.0136	6.2141	6.0136	6.2141 (56)
If cylinder contains dedicated solar storage												
	6.2141	5.6127	6.2141	6.0136	6.2141	6.0136	6.2141	6.2141	6.0136	6.2141	6.0136	6.2141 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month												
	156.1547	137.4175	143.8055	128.2005	125.1169	111.0560	105.9530	117.2344	117.3317	132.9714	141.4984	152.1576 (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												
	156.1547	137.4175	143.8055	128.2005	125.1169	111.0560	105.9530	117.2344	117.3317	132.9714	141.4984	152.1576 (64)
								Total per year (kWh/year) = Sum(64)m =				1568.8974 (64)
Heat gains from water heating, kWh/month												
	65.7017	58.1380	61.5956	55.9624	55.3816	50.2619	49.0096	52.7607	52.3485	57.9932	60.3839	64.3727 (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	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.7963	16.6947	13.5770	10.2787	7.6834	6.4867	7.0091	9.1107	12.2283	15.5267	18.1219	19.3187	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	159.5153	161.1706	156.9994	148.1193	136.9098	126.3745	119.3363	117.6810	121.8522	130.7323	141.9418	152.4771	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	(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)													
	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	(71)
Water heating gains (Table 5)													
	88.3087	86.5149	82.7898	77.7255	74.4377	69.8081	65.8732	70.9149	72.7063	77.9479	83.8666	86.5224	(72)
Total internal gains													
	320.0664	317.8262	306.8122	289.5696	272.4770	256.1154	245.6646	251.1527	260.2329	277.6529	297.3763	311.7642	(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	
East	2.3900	19.6403	0.6300	0.7000	0.7700	14.3455	(76)

Solar gains	14.3455	28.0629	46.2156	67.4028	82.6046	84.5605	80.5051	69.1527	53.7507	33.2990	17.8872	11.7971	(83)
Total gains	334.4119	345.8892	353.0279	356.9724	355.0816	340.6759	326.1697	320.3054	313.9836	310.9520	315.2636	323.5613	(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	104.9448	105.4151	105.8802	108.1210	108.5508	110.5974	110.5974	110.9849	109.8000	108.5508	107.6848	106.7941	
alpha	7.9963	8.0277	8.0587	8.2081	8.2367	8.3732	8.3732	8.3990	8.3200	8.2367	8.1790	8.1196	
util living area	0.9961	0.9936	0.9855	0.9524	0.8494	0.6397	0.4633	0.4912	0.7405	0.9482	0.9902	0.9969	(86)
MIT	20.4881	20.5536	20.6744	20.8385	20.9545	20.9961	20.9998	20.9996	20.9879	20.8688	20.6627	20.4801	(87)
Th 2	20.3748	20.3774	20.3800	20.3921	20.3944	20.4050	20.4050	20.4069	20.4009	20.3944	20.3898	20.3850	(88)
util rest of house	0.9949	0.9917	0.9810	0.9381	0.8121	0.5829	0.4008	0.4283	0.6842	0.9301	0.9870	0.9959	(89)
MIT 2	19.6864	19.7837	19.9603	20.2005	20.3497	20.4023	20.4048	20.4067	20.3916	20.2454	19.9525	19.6832	(90)
Living area fraction										fLA = Living area / (4) =		0.5612	(91)
MIT	20.1363	20.2158	20.3611	20.5585	20.6891	20.7356	20.7387	20.7395	20.7263	20.5953	20.3511	20.1304	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.1363	20.2158	20.3611	20.5585	20.6891	20.7356	20.7387	20.7395	20.7263	20.5953	20.3511	20.1304	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9944	0.9911	0.9809	0.9423	0.8310	0.6147	0.4359	0.4636	0.7154	0.9367	0.9867	0.9955	(94)
Useful gains	332.5332	342.8248	346.2786	336.3918	295.0599	209.4236	142.1761	148.5062	224.6120	291.2603	311.0745	322.0925	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	573.6359	552.3050	497.6496	409.8988	314.7934	210.8884	142.2532	148.6324	229.4083	350.0283	467.7778	567.0501	(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	179.3804	140.7707	112.6201	52.9251	14.6817	0.0000	0.0000	0.0000	0.0000	43.7234	112.8264	182.2485	(98)
Space heating												839.1763	(98)
Space heating per m2											(98) / (4) =	15.3302	(99)

8c. Space cooling requirement

Not applicable

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												93.5000	(206)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement												897.5147	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	179.3804	140.7707	112.6201	52.9251	14.6817	0.0000	0.0000	0.0000	0.0000	43.7234	112.8264	182.2485	(98)
Space heating efficiency (main heating system 1)													
	93.5000	93.5000	93.5000	93.5000	93.5000	0.0000	0.0000	0.0000	0.0000	93.5000	93.5000	93.5000	(210)
Space heating fuel (main heating system)													
	191.8507	150.5569	120.4493	56.6044	15.7024	0.0000	0.0000	0.0000	0.0000	46.7630	120.6699	194.9182	(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													
	156.1547	137.4175	143.8055	128.2005	125.1169	111.0560	105.9530	117.2344	117.3317	132.9714	141.4984	152.1576	(64)
Efficiency of water heater												79.8000	(216)
(217)m	85.1843	84.8781	84.1707	82.6555	80.8033	79.8000	79.8000	79.8000	79.8000	82.2050	84.2173	85.2961	(217)
Fuel for water heating, kWh/month													
	183.3139	161.8997	170.8499	155.1021	154.8412	139.1679	132.7732	146.9103	147.0322	161.7557	168.0158	178.3875	(219)
Water heating fuel used												1900.0493	(219)
Annual totals kWh/year													
Space heating fuel - main system												897.5147	(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)												331.9482	(232)
Total delivered energy for all uses												3204.5122	(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	897.5147	0.2160	193.8632	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1900.0493	0.2160	410.4106	(264)
Space and water heating			604.2738	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	331.9482	0.5190	172.2811	(268)
Total CO2, kg/m2/year			815.4799	(272)
Emissions per m2 for space and water heating			11.0390	(272a)
Fuel factor (mains gas)			1.0000	
Emissions per m2 for lighting			3.1473	(272b)
Emissions per m2 for pumps and fans			0.7111	(272c)
Target Carbon Dioxide Emission Rate (TER) = (11.0390 * 1.00) + 3.1473 + 0.7111, rounded to 2 d.p.			14.9000	(273)

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.7400 (1b)	x	2.5000 (2b)	=	136.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.7400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	136.8500	(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) =	0.1461	(8)
Pressure test		Yes	
Measured/design AP50		3.0000	
Infiltration rate		0.2961	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2517	(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	0.3209	0.3147	0.3084	0.2769	0.2706	0.2391	0.2391	0.2328	0.2517	0.2706	0.2832	0.2958	(22b)
Effective ac	0.5515	0.5495	0.5475	0.5383	0.5366	0.5286	0.5286	0.5271	0.5317	0.5366	0.5401	0.5437	(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	
Windows (Uw = 1.40)			2.3900	1.3258	3.1686			(27)
2. Column wall	8.1400		8.1400	0.2700	2.1978	150.0000	1221.0000	(29a)
3. Uni panel cladding	5.0500	2.3900	2.6600	0.1400	0.3724	14.0000	37.2400	(29a)
1. Uni panel brick	12.1200		12.1200	0.1400	1.6968	14.0000	169.6800	(29a)
Total net area of external elements Aum(A, m2)			25.3100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		7.4356			(33)
Party Wall 1			52.1000	0.0000	0.0000	180.0000	9378.0000	(32)
Party Wall 2			26.2200	0.0000	0.0000	70.0000	1835.4000	(32)
Party Floor			54.7400			40.0000	2189.6000	(32d)
Party Ceilings			54.7400			30.0000	1642.2000	(32b)
Internal Wall - SFS			78.0000			9.0000	702.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17175.1200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		313.7581 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		3.4222 (36)
Total fabric heat loss	(33) + (36) =	10.8578 (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	24.9062	24.8159	24.7273	24.3115	24.2337	23.8715	23.8715	23.8045	24.0110	24.2337	24.3911	24.5556	(38)
Heat transfer coeff	35.7639	35.6736	35.5851	35.1693	35.0915	34.7293	34.7293	34.6622	34.8688	35.0915	35.2489	35.4134	(39)
Average = Sum(39)m / 12 =												35.1689	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.6533	0.6517	0.6501	0.6425	0.6411	0.6344	0.6344	0.6332	0.6370	0.6411	0.6439	0.6469	(40)
HLP (average)												0.6425	(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		1.8297 (42)
Average daily hot water use (litres/day)		77.6563 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	85.4219	82.3156	79.2094	76.1031	72.9969	69.8906	69.8906	72.9969	76.1031	79.2094	82.3156	85.4219	(44)
Energy conte	126.6782	110.7935	114.3290	99.6748	95.6404	82.5304	76.4765	87.7579	88.8060	103.4948	112.9727	122.6811	(45)
Energy content (annual)										Total = Sum(45)m =		1221.8353	(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)

CALCULATION OF FABRIC ENERGY EFFICIENCY 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)

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

26.9191	23.5436	24.2949	21.1809	20.3236	17.5377	16.2513	18.6486	18.8713	21.9927	24.0067	26.0697	(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	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

18.7963	16.6947	13.5770	10.2787	7.6834	6.4867	7.0091	9.1107	12.2283	15.5267	18.1219	19.3187	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

159.5153	161.1706	156.9994	148.1193	136.9098	126.3745	119.3363	117.6810	121.8522	130.7323	141.9418	152.4771	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	(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)

-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	(71)

Water heating gains (Table 5)

36.1816	35.0352	32.6545	29.4179	27.3166	24.3579	21.8431	25.0653	26.2101	29.5600	33.3426	35.0400	(72)

Total internal gains

264.9393	263.3465	253.6769	238.2620	222.3560	207.6652	198.6345	202.3030	210.7368	226.2651	243.8524	257.2818	(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	
East	2.3900	19.6403	0.4200	0.7000	0.7700	9.5637	(76)

Solar gains	9.5637	18.7086	30.8104	44.9352	55.0697	56.3737	53.6700	46.1018	35.8338	22.1994	11.9248	7.8647	(83)
Total gains	274.5030	282.0551	284.4873	283.1971	277.4257	264.0389	252.3046	248.4048	246.5706	248.4644	255.7772	265.1465	(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	133.3988	133.7365	134.0692	135.6544	135.9552	137.3730	137.3730	137.6388	136.8234	135.9552	135.3481	134.7193	
alpha	9.8933	9.9158	9.9379	10.0436	10.0637	10.1582	10.1582	10.1759	10.1216	10.0637	10.0232	9.9813	
util living area	0.9998	0.9996	0.9988	0.9943	0.9649	0.8147	0.6042	0.6393	0.8985	0.9932	0.9993	0.9998	(86)
MIT	20.5015	20.5484	20.6418	20.7773	20.9093	20.9889	20.9994	20.9990	20.9705	20.8172	20.6376	20.4902	(87)
Th 2	20.3822	20.3837	20.3851	20.3919	20.3932	20.3991	20.3991	20.4002	20.3968	20.3932	20.3906	20.3879	(88)
util rest of house	0.9997	0.9994	0.9982	0.9914	0.9464	0.7506	0.5226	0.5575	0.8489	0.9891	0.9989	0.9998	(89)
MIT 2	19.9178	19.9660	20.0605	20.2011	20.3274	20.3941	20.3990	20.3999	20.3809	20.2417	20.0613	19.9116	(90)
Living area fraction									fLA = Living area / (4) =			0.5612	(91)
MIT	20.2454	20.2928	20.3868	20.5245	20.6540	20.7279	20.7359	20.7361	20.7118	20.5647	20.3847	20.2363	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.2454	20.2928	20.3868	20.5245	20.6540	20.7279	20.7359	20.7361	20.7118	20.5647	20.3847	20.2363	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9996	0.9993	0.9982	0.9922	0.9553	0.7868	0.5685	0.6036	0.8765	0.9905	0.9989	0.9997	(94)
Useful gains	274.4001	281.8695	283.9866	280.9800	265.0192	207.7437	143.4357	149.9418	216.1273	246.1018	255.5063	265.0759	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	570.2710	549.1172	494.1616	408.8237	314.2075	212.8183	143.6384	150.3005	230.5458	349.6748	468.2702	567.8993	(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	220.1279	179.5905	156.3702	92.0475	36.5961	0.0000	0.0000	0.0000	0.0000	77.0583	153.1900	225.3006	(98)
Space heating												1140.2812	(98)
Space heating per m2											(98) / (4) =	20.8309	(99)

8c. Space cooling requirement

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	326.4554	256.9968	263.4330	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9628	0.9914	0.9889	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	314.3020	254.7799	260.5103	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	379.4876	364.6138	361.7734	0.0000	0.0000	0.0000	0.0000	(103)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	(103a)
Space cooling kWh													

CALCULATION OF FABRIC ENERGY EFFICIENCY 09 Jan 2014

	0.0000	0.0000	0.0000	0.0000	0.0000	46.9336	81.7164	75.3398	0.0000	0.0000	0.0000	0.0000 (104)
Space cooling												203.9898 (104)
Cooled fraction											fC = cooled area / (4) =	1.0000 (105)
Intermittency factor (Table 10b)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000 (106)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	11.7334	20.4291	18.8349	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												50.9974 (107)
Space cooling per m2												0.9316 (108)
Energy for space heating												20.8309 (99)
Energy for space cooling												0.9316 (108)
Total												21.7625 (109)
Dwelling Fabric Energy Efficiency (DFEE)												21.8 (109)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.7400 (1b)	x	2.5000 (2b)	=	136.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.7400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	136.8500	(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) =	0.1461	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.3961	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3367	(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	0.4293	0.4209	0.4125	0.3704	0.3620	0.3199	0.3199	0.3115	0.3367	0.3620	0.3788	0.3957	(22b)
Effective ac	0.5922	0.5886	0.5851	0.5686	0.5655	0.5512	0.5512	0.5485	0.5567	0.5655	0.5718	0.5783	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opening Type (Uw = 1.40)			2.3900	1.3258	3.1686			(27)
2. Column wall	8.1400		8.1400	0.1800	1.4652			(29a)
3. Uni panel cladding	5.0500	2.3900	2.6600	0.1800	0.4788			(29a)
1. Uni panel brick	12.1200		12.1200	0.1800	2.1816			(29a)
Total net area of external elements Aum(A, m2)			25.3100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		7.2942			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							2.1864	(36)
Total fabric heat loss					(33) + (36) =		9.4806	(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	26.7422	26.5806	26.4222	25.6781	25.5389	24.8908	24.8908	24.7708	25.1405	25.5389	25.8205	26.1149	(38)
Heat transfer coeff	36.2228	36.0611	35.9027	35.1587	35.0195	34.3714	34.3714	34.2514	34.6210	35.0195	35.3011	35.5955	(39)
Average = Sum(39)m / 12 =												35.1580	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.6617	0.6588	0.6559	0.6423	0.6397	0.6279	0.6279	0.6257	0.6325	0.6397	0.6449	0.6503	(40)
HLP (average)												0.6423	(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	1.8297	(42)
Average daily hot water use (litres/day)	77.6563	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	85.4219	82.3156	79.2094	76.1031	72.9969	69.8906	69.8906	72.9969	76.1031	79.2094	82.3156	85.4219	(44)
Energy conte	126.6782	110.7935	114.3290	99.6748	95.6404	82.5304	76.4765	87.7579	88.8060	103.4948	112.9727	122.6811	(45)
Energy content (annual)										Total = Sum(45)m =		1221.8353	(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)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

Heat gains from water heating, kWh/month

	26.9191	23.5436	24.2949	21.1809	20.3236	17.5377	16.2513	18.6486	18.8713	21.9927	24.0067	26.0697 (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	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	91.4869	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	18.7963	16.6947	13.5770	10.2787	7.6834	6.4867	7.0091	9.1107	12.2283	15.5267	18.1219	19.3187	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	159.5153	161.1706	156.9994	148.1193	136.9098	126.3745	119.3363	117.6810	121.8522	130.7323	141.9418	152.4771	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	32.1487	(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)

	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	-73.1895	(71)

Water heating gains (Table 5)

	36.1816	35.0352	32.6545	29.4179	27.3166	24.3579	21.8431	25.0653	26.2101	29.5600	33.3426	35.0400	(72)

Total internal gains

	264.9393	263.3465	253.6769	238.2620	222.3560	207.6652	198.6345	202.3030	210.7368	226.2651	243.8524	257.2818	(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	
East	2.3900	19.6403	0.6300	0.7000	0.7700	14.3455	(76)

Solar gains	14.3455	28.0629	46.2156	67.4028	82.6046	84.5605	80.5051	69.1527	53.7507	33.2990	17.8872	11.7971	(83)
Total gains	279.2848	291.4094	299.8926	305.6647	304.9606	292.2257	279.1396	271.4557	264.4875	259.5641	261.7396	269.0789	(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	104.9448	105.4151	105.8802	108.1210	108.5508	110.5974	110.5974	110.9849	109.8000	108.5508	107.6848	106.7941	
alpha	7.9963	8.0277	8.0587	8.2081	8.2367	8.3732	8.3732	8.3990	8.3200	8.2367	8.1790	8.1196	
util living area	0.9989	0.9980	0.9950	0.9804	0.9187	0.7342	0.5403	0.5779	0.8420	0.9815	0.9973	0.9992	(86)
MIT	20.3862	20.4540	20.5811	20.7623	20.9139	20.9897	20.9992	20.9987	20.9694	20.7930	20.5660	20.3787	(87)
Th 2	20.3748	20.3774	20.3800	20.3921	20.3944	20.4050	20.4050	20.4069	20.4009	20.3944	20.3898	20.3850	(88)
util rest of house	0.9985	0.9974	0.9933	0.9733	0.8910	0.6736	0.4681	0.5048	0.7899	0.9735	0.9962	0.9989	(89)
MIT 2	19.8034	19.8734	20.0021	20.1907	20.3324	20.3999	20.4047	20.4065	20.3834	20.2235	19.9960	19.8049	(90)
Living area fraction									fLA = Living area / (4) =			0.5612	(91)
MIT	20.1305	20.1992	20.3270	20.5115	20.6587	20.7309	20.7384	20.7388	20.7122	20.5431	20.3159	20.1269	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.1305	20.1992	20.3270	20.5115	20.6587	20.7309	20.7384	20.7388	20.7122	20.5431	20.3159	20.1269	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9984	0.9972	0.9931	0.9749	0.9039	0.7075	0.5087	0.5459	0.8182	0.9758	0.9961	0.9988	(94)
Useful gains	278.8293	290.5885	297.8266	297.9878	275.6657	206.7380	141.9940	148.1830	216.4069	253.2701	260.7177	268.7455	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	573.4233	551.7083	496.4269	408.2434	313.7302	210.7278	142.2410	148.6112	228.9224	348.2031	466.5362	566.9272	(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	219.1780	175.4725	147.7587	79.3840	28.3200	0.0000	0.0000	0.0000	0.0000	70.6301	148.1893	221.8472	(98)
Space heating												1090.7799	(98)
Space heating per m2										(98) / (4) =		19.9266	(99)

8c. Space cooling requirement

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	323.0912	254.3484	260.3106	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9688	0.9911	0.9883	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	313.0060	252.0778	257.2768	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	412.4332	395.9794	388.7160	0.0000	0.0000	0.0000	0.0000	(103)
Month fracti	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	(103a)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	71.5876	107.0628	97.7907	0.0000	0.0000	0.0000	0.0000	(104)
Space cooling												276.4411	(104)
Cooled fraction									fC = cooled area / (4) =			1.0000	(105)
Intermittency factor (Table 10b)	0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000	(106)

Space cooling kWh

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY 09 Jan 2014

	0.0000	0.0000	0.0000	0.0000	0.0000	17.8969	26.7657	24.4477	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling												69.1103 (107)
Space cooling per m2												1.2625 (108)
Energy for space heating												19.9266 (99)
Energy for space cooling												1.2625 (108)
Total												21.1891 (109)
Target Fabric Energy Efficiency (TFEE)												24.4 (109)

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

Design SAP
elmhurst energy

Property Reference	WH190 Plot 448	**Issued on Date**	24/02/2022
Assessment Reference	Plot 448	**Prop Type Ref**	Flat Type B1N-10
Property	Abbey Road Retail Park, Barking		

SAP Rating	86 B	**DER**	7.26	**TER**	14.90
Environmental	96 A	**% DER<TER**	51.27		
CO_2 Emissions (t/year)	0.32	**DFEE**	21.76	**TFEE**	24.37
General Requirements Compliance	Pass	**% DFEE<TFEE**	10.69		

Assessor Details	Mr. Paul Pasifull, Stansted Environmental Services, Tel: 01277225709, paul@sestesting.com	**Assessor ID**	P722-0001
Client			

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

Orientation	West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2022
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	8.77 m	54.74 m²	2.50 m

7.0 Living Area	30.72	m²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	323.76	kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
2. Column wall	Solid Wall	Solid wall : plasterboard on dabs, 200 mm dense block, insulated externally	0.27	150.00	8.14	8.14
3. Uni panel cladding	Steel Frame	Steel frame wall (warm frame or hybrid construction)	0.14	14.00	5.05	2.66
1. Uni panel brick	Steel Frame	Steel frame wall (warm frame or hybrid construction)	0.14	14.00	12.12	12.12

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	52.10
Party Wall 2	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	26.22

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall - SFS	Other	9.00	78.00

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceilings	Precast concrete planks floor, screed, carpeted	30.00	54.74

11.1 Party Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Precast concrete planks floor, screed, carpeted	40.00	54.74

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double Low-E Hard 0.2			0.42		0.70	1.40
Full glazed door	Manufacturer	Window	Double Low-E Hard 0.2			0.42		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Windows East	Window	[2] 3. Uni panel cladding	East	None	0.00					2.39	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	Yes	

17.0 Thermal Bridging — Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	4.30	0.300	Yes
Table K1 - Approved	E4 Jamb	8.44	0.050	Yes
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	8.77	0.070	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	8.77	0.070	No
Table K1 - Approved	E18 Party wall between dwellings	2.68	0.060	No
Table K1 - Default	E25 Staggered party wall between dwellings	2.68	0.120	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	24.75	0.000	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	24.75	0.000	No

Y-value	0.135	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP_{50}		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows fully open
Cross ventilation possible	No
Night Ventilation	Yes
Air change rate	4.00

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database

Type	Mechanical extract ventilation - centralised
MV Reference Number	500644
Configuration	2
Manufacturer SFP	0.14
Duct Type	Rigid
Wet Rooms	2

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				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System No

22.0 Lighting

Internal

Total number of light fittings	10	
Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	No

23.0 Electricity Tariff Standard

24.0 Main Heating 1 None

26.0 Community Heating

Community Heating	Space and Water Combined

Space Community Heating

PCDF Index	n/a
Distribution Loss	Piping system >= 1991, pre-insulated, low temp, variable flow
Controls	CCL Charging system linked to use of community heating, programmer and at least two room stats
SAP Code	2312
PCDF Index	n/a

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical
Heat Source 1	Boilers	Mains Gas	Space and Water	91.40	17.40%			
Heat Source 2	Combined Heat and Power	Mains Gas	Space and Water	91.40	82.60%	38.60	1.00	33.20

28.0 Water Heating HWP From main heating 1

Water Heating	Community Heating
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
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	901	
29.0 Hot Water Cylinder	HIU	
Insulation Type	Measured Loss	
Cylinder Volume	10.00	L
Loss	0.40	kWh/day
32.0 Photovoltaic Unit	More Dwellings, One Block	
Apportioned	265.00	kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None