

Full SAP Calculation Printout



Plot Reference	UNIT 08			Issued on Date	08/07/2026
Assessment Reference	001	Plot Type Ref	UNIT 08		
Plot Address	UNIT 08, Stoney Wood Quarter, 34 The Fairway, LONDON, NW7 3HS			SAP Version	10.2
SAP Rating	83 B	DER	3.38	TER	12.72
Environmental	97 A	% DER < TER			73.43
CO ₂ Emissions (t/year)	0.27	DFEE	35.28	TFEE	35.77
Compliance Check	See BREL	% DFEE < TFEE			1.38
% DPER < TPER	46.64	DPER	36.07	TPER	67.59
Assessor Details	Mr. Ondrej Gajdos			Assessor ID	W452-0001
Client					

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	35.5000 (1b)	x 2.5000 (2b)	= 88.7500 (1b) - (3b)
First floor	32.0000 (1c)	x 2.8000 (2c)	= 89.6000 (1c) - (3c)
Second floor	23.8000 (1d)	x 2.6500 (2d)	= 63.0700 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	91.3000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 241.4200 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	30.0000 / (5) = 0.1243 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2743 (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) = 0.1920 (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	0.2448	0.2400	0.2352	0.2112	0.2064	0.1824	0.1824	0.1776	0.1920	0.2064	0.2160	0.2256 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5300	0.5288	0.5277	0.5223	0.5213	0.5166	0.5166	0.5158	0.5184	0.5213	0.5233	0.5254 (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
Main dwelling							
dl			2.9000	1.0000	2.9000		(26)
1			46.2200	0.7940	36.6967		(27)
exposed wall	93.7400	49.1200	44.6200	0.1500	6.6930	60.0000	2677.1999 (29a)
terraces	9.0000		9.0000	0.1000	0.9000	9.0000	81.0000 (30)
flat roof	16.0000		16.0000	0.1000	1.6000	9.0000	144.0000 (30)
pitched rafters	8.7000		8.7000	0.1000	0.8700	9.0000	78.3000 (30)
oval roof	1.2000		1.2000	0.1000	0.1200	9.0000	10.8000 (30)
Total net area of external elements Aum(A, m ²)			128.6400				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	49.7797	(33)
Main dwelling							
pw			93.1050	0.0000	0.0000	110.0000	10241.5504 (32)
pf			35.5000			40.0000	1420.0000 (32d)
iw			101.8400			9.0000	916.5600 (32c)
if			54.2000			18.0000	975.6000 (32d)
ic			54.2000			9.0000	487.8000 (32e)

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Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K
List of Thermal Bridges

(28)...(30) + (32) + (32a)...(32e) = 17032.8102 (34)
186.5587 (35)

	Length	Psi-value	Total
K1 Element	22.2400	0.0500	1.1120
E2 Other lintels (including other steel lintels)	21.2400	0.0500	1.0620
E3 Sill	76.5000	0.0500	3.8250
E4 Jamb	8.0000	0.0000	0.0000
E6 Intermediate floor within a dwelling	13.2000	0.0700	0.9240
E7 Party floor between dwellings (in blocks of flats)	10.3000	0.2400	2.4720
E24 Eaves (insulation at ceiling level - inverted)	6.3000	0.0400	0.2520
E11 Eaves (insulation at rafter level)	2.0000	0.0800	0.1600
E13 Gable (insulation at rafter level)	14.9000	0.1600	2.3840
E14 Flat roof	23.0000	0.0900	2.0700
E16 Corner (normal)	10.3000	-0.0900	-0.9270
E17 Corner (inverted - internal area greater than external area)	15.6000	0.0600	0.9360
E18 Party wall between dwellings			
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			14.2700 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	64.0497 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	42.2211	42.1284	42.0376	41.6109	41.5310	41.1594	41.1594	41.0906	41.3025	41.5310	41.6925	41.8614 (38)
Heat transfer coeff	106.2708	106.1782	106.0873	105.6606	105.5808	105.2091	105.2091	105.1403	105.3523	105.5808	105.7423	105.9111 (39)
Average = Sum(39)m / 12 =												105.6602
HLP	1.1640	1.1630	1.1620	1.1573	1.1564	1.1523	1.1523	1.1516	1.1539	1.1564	1.1582	1.1600 (40)
HLP (average)												1.1573
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6431 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	29.5959	29.1563	28.5374	27.3961	26.5416	25.5940	25.0821	25.6968	26.3660	27.3799	28.5447	29.4958 (42b)
Hot water usage for other uses	41.6980	40.1817	38.6654	37.1491	35.6328	34.1165	34.1165	35.6328	37.1491	38.6654	40.1817	41.6980 (42c)
Average daily hot water use (litres/day)												65.3473 (43)
Daily hot water use	71.2939	69.3380	67.2028	64.5452	62.1744	59.7105	59.1987	61.3296	63.5151	66.0453	68.7264	71.1938 (44)
Energy conte	112.9120	98.7364	103.2882	88.3592	83.6987	73.4210	71.5957	75.9389	78.3205	89.6229	97.9134	111.4723 (45)
Energy content (annual)										Total = Sum(45)m =		1085.2791
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 (or HIU 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												
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 (57)
Combi 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	95.9752	83.9260	87.7949	75.1053	71.1439	62.4079	60.8563	64.5480	66.5724	76.1795	83.2263	94.7515 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
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 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	95.9752	83.9260	87.7949	75.1053	71.1439	62.4079	60.8563	64.5480	66.5724	76.1795	83.2263	94.7515 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		922.4872 (64)
Electric shower(s)	54.8858	48.9037	53.4010	50.9599	51.9161	49.5229	51.1737	51.9161	50.9599	53.4010	52.3968	54.8858 (64a)
Heat gains from water heating, kWh/month	37.7153	33.2074	35.2990	31.5163	30.7650	27.9827	28.0075	29.1160	29.3831	32.3951	33.9058	37.4093 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	121.7834	134.8316	121.7834	125.8428	121.7834	125.8428	121.7834	121.7834	125.8428	121.7834	125.8428	121.7834 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	241.4492	243.9546	237.6409	224.1997	207.2326	191.2859	180.6325	178.1270	184.4407	197.8820	214.8491	230.7958 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155 (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)	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240 (71)
Water heating gains (Table 5)	50.6926	49.4158	47.4449	43.7726	41.3508	38.8649	37.6445	39.1345	40.8098	43.5418	47.0914	50.2813 (72)
Total internal gains	476.5716	490.8485	469.5156	456.4616	433.0132	418.6400	402.7068	401.6913	413.7399	425.8536	450.4298	465.5070 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	26.7000	11.2829	0.5300	0.7000	0.7700	77.4534 (75)
East	2.0000	19.6403	0.5300	0.7000	0.7700	10.0991 (76)
Southeast	15.9200	36.7938	0.5300	0.7000	0.7700	150.6001 (77)

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Southwest	0.7500	36.7938	0.5300	0.7000	0.7700	7.0949 (79)
Northwest	0.8500	11.2829	0.5300	0.7000	0.7700	2.4657 (81)

Solar gains	247.7133	451.0467	693.1569	984.1797	1215.2426	1255.7028	1190.1664	1010.5209	792.9341	519.1218	302.0336	208.5251 (83)
Total gains	724.2848	941.8952	1162.6725	1440.6413	1648.2558	1674.3429	1592.8732	1412.2122	1206.6740	944.9754	752.4634	674.0320 (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	44.5215	44.5604	44.5985	44.7786	44.8125	44.9708	44.9708	45.0002	44.9097	44.8125	44.7440	44.6727
alpha	3.9681	3.9707	3.9732	3.9852	3.9875	3.9981	3.9981	4.0000	3.9940	3.9875	3.9829	3.9782
util living area	0.9829	0.9556	0.8932	0.7491	0.5627	0.3958	0.2891	0.3394	0.5680	0.8546	0.9648	0.9868 (86)
MIT	19.4439	19.8147	20.2679	20.7077	20.9202	20.9844	20.9965	20.9935	20.9391	20.5741	19.9095	19.3673 (87)
Th 2	19.9489	19.9497	19.9505	19.9543	19.9550	19.9583	19.9583	19.9589	19.9570	19.9550	19.9536	19.9521 (88)
util rest of house	0.9788	0.9457	0.8715	0.7082	0.5083	0.3338	0.2214	0.2640	0.4936	0.8168	0.9553	0.9836 (89)
MIT 2	18.5520	18.9141	19.3447	19.7377	19.9055	19.9512	19.9573	19.9569	19.9256	19.6384	19.0148	18.4789 (90)
Living area fraction									fLA = Living area / (4) =			0.2848 (91)
MIT	18.8060	19.1706	19.6076	20.0140	20.1944	20.2454	20.2533	20.2521	20.2142	19.9049	19.2696	18.7319 (92)
Temperature adjustment												0.0000
adjusted MIT	18.8060	19.1706	19.6076	20.0140	20.1944	20.2454	20.2533	20.2521	20.2142	19.9049	19.2696	18.7319 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9729	0.9368	0.8635	0.7107	0.5211	0.3511	0.2407	0.2854	0.5126	0.8147	0.9474	0.9786 (94)
Useful gains	704.6567	882.3273	1003.9136	1023.8805	858.9148	587.8347	383.3657	403.0564	618.5547	769.8931	712.8657	659.6063 (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	1541.5669	1515.2255	1390.5480	1174.3086	896.8503	593.9502	384.3578	405.0143	644.1450	982.4148	1286.8434	1539.0873 (97)
Space heating kWh	622.6612	425.3076	287.6560	108.3082	28.2240	0.0000	0.0000	0.0000	0.0000	158.1162	413.2640	654.3338 (98a)
Space heating requirement - total per year (kWh/year)												2697.8709
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	622.6612	425.3076	287.6560	108.3082	28.2240	0.0000	0.0000	0.0000	0.0000	158.1162	413.2640	654.3338 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2697.8709
Space heating per m2										(98c) / (4) =		29.5495 (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	988.9657	778.5475	799.0663	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9639	0.9804	0.9683	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	953.2623	763.2825	773.7603	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1909.0900	1816.2262	1607.4536	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	688.1960	783.3901	620.2679	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	172.0490	195.8475	155.0670	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												522.9635 (107)
Energy for space heating												29.5495 (99)
Energy for space cooling												5.7280 (108)
Total												35.2775 (109)
Fabric Energy Efficiency (DFEE)												35.3 (109)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022) CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	35.5000 (1b)	x 2.5000 (2b)	= 88.7500 (1b) - (3b)
First floor	32.0000 (1c)	x 2.8000 (2c)	= 89.6000 (1c) - (3c)
Second floor	23.8000 (1d)	x 2.6500 (2d)	= 63.0700 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	91.3000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.4200 (5)

2. Ventilation rate

m3 per hour

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Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000	Air changes per hour	0.1243 (8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50				5.0000 (17)
Infiltration rate				0.3743 (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) =			0.2620 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	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)
Adj infilt rate	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)
	0.3340	0.3275	0.3209	0.2882	0.2816	0.2489	0.2489	0.2423	0.2620	0.2816	0.2947	0.3078	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.5558	0.5536	0.5515	0.5415	0.5397	0.5310	0.5310	0.5294	0.5343	0.5397	0.5434	0.5474	(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
Main dwelling							
TER Opaque door			2.9000	1.0000	2.9000		(26)
TER Opening Type			19.9100	1.1450	22.7977		(27)
exposed wall	93.7400	22.8100	70.9300	0.1800	12.7674		(29a)
terraces	9.0000		9.0000	0.1100	0.9900		(30)
flat roof	16.0000		16.0000	0.1100	1.7600		(30)
pitched rafters	8.7000		8.7000	0.1100	0.9570		(30)
oval roof	1.2000		1.2000	0.1100	0.1320		(30)
Total net area of external elements Aum(A, m2)			128.6400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.3041		(33)
Main dwelling							
pw			93.1050	0.0000	0.0000		(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 186.5587 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	22.2400	0.0500	1.1120
E2 Other lintels (including other steel lintels)	21.2400	0.0500	1.0620
E3 Sill	76.5000	0.0500	3.8250
E4 Jamb	8.0000	0.0000	0.0000
E6 Intermediate floor within a dwelling	13.2000	0.0700	0.9240
E7 Party floor between dwellings (in blocks of flats)	10.3000	0.2400	2.4720
E24 Eaves (insulation at ceiling level - inverted)	6.3000	0.0400	0.2520
E11 Eaves (insulation at rafter level)	2.0000	0.0800	0.1600
E13 Gable (insulation at rafter level)	14.9000	0.0800	1.1920
E14 Flat roof	23.0000	0.0900	2.0700
E16 Corner (normal)	10.3000	-0.0900	-0.9270
E17 Corner (inverted - internal area greater than external area)	15.6000	0.0600	0.9360
E18 Party wall between dwellings			

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 13.0780 (36)
Point Thermal Bridges 0.0000
Total fabric heat loss (33) + (36) + (36a) = 55.3821 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	44.2789	44.1063	43.9371	43.1425	42.9939	42.3018	42.3018	42.1736	42.5684	42.9939	43.2946	43.6090	(38)
Average = Sum(39)m / 12 =	99.6610	99.4884	99.3192	98.5246	98.3760	97.6839	97.6839	97.5558	97.9505	98.3760	98.6767	98.9911	(39)
												98.5239	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0916	1.0897	1.0878	1.0791	1.0775	1.0699	1.0699	1.0685	1.0728	1.0775	1.0808	1.0842	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6431 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	29.5959	29.1563	28.5374	27.3961	26.5416	25.5940	25.0821	25.6968	26.3660	27.3799	28.5447	29.4958	(42b)
Hot water usage for other uses	41.6980	40.1817	38.6654	37.1491	35.6328	34.1165	34.1165	35.6328	37.1491	38.6654	40.1817	41.6980	(42c)
Average daily hot water use (litres/day)												65.3473	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	71.2939	69.3380	67.2028	64.5452	62.1744	59.7105	59.1987	61.3296	63.5151	66.0453	68.7264	71.1938	(44)
Energy content (annual)	112.9120	98.7364	103.2882	88.3592	83.6987	73.4210	71.5957	75.9389	78.3205	89.6229	97.9134	111.4723	(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 (or HIU 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)
Combi 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	(61)
Total heat required for water heating calculated for each month													

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WWHRS	95.9752	83.9260	87.7949	75.1053	71.1439	62.4079	60.8563	64.5480	66.5724	76.1795	83.2263	94.7515 (62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
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 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
12Total per year (kWh/year)	95.9752	83.9260	87.7949	75.1053	71.1439	62.4079	60.8563	64.5480	66.5724	76.1795	83.2263	94.7515 (64)
Electric shower(s)												922.4872 (64)
												922 (64)
12Total per year (kWh/year)												
Electric shower(s)	54.8858	48.9037	53.4010	50.9599	51.9161	49.5229	51.1737	51.9161	50.9599	53.4010	52.3968	54.8858 (64a)
												624.3227 (64a)
Heat gains from water heating, kWh/month												
	37.7153	33.2074	35.2990	31.5163	30.7650	27.9827	28.0075	29.1160	29.3831	32.3951	33.9058	37.4093 (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	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	132.1550	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	121.8636	134.9204	121.8636	125.9257	121.8636	125.9257	121.8636	121.8636	125.9257	121.8636	125.9257	121.8636	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	241.4492	243.9546	237.6409	224.1997	207.2326	191.2859	180.6325	178.1270	184.4407	197.8820	214.8491	230.7958	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	36.2155	(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)	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	-105.7240	(71)
Water heating gains (Table 5)	50.6926	49.4158	47.4449	43.7726	41.3508	38.8649	37.6445	39.1345	40.8098	43.5418	47.0914	50.2813	(72)
Total internal gains	476.6518	490.9373	469.5958	456.5445	433.0934	418.7229	402.7871	401.7715	413.8228	425.9338	450.5127	465.5872	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				11.5000	11.2829		0.6300		0.7000		0.7700		39.6545 (75)
East				0.8600	19.6403		0.6300		0.7000		0.7700		5.1620 (76)
Southeast				6.8600	36.7938		0.6300		0.7000		0.7700		77.1385 (77)
Southwest				0.3200	36.7938		0.6300		0.7000		0.7700		3.5983 (79)
Northwest				0.3700	11.2829		0.6300		0.7000		0.7700		1.2758 (81)
Solar gains	126.8290	230.9373	354.9038	503.9203	622.2384	642.9591	609.4008	517.4109	405.9939	265.7933	154.6413	106.7646	(83)
Total gains	603.4808	721.8747	824.4996	960.4648	1055.3318	1061.6821	1012.1879	919.1825	819.8166	691.7272	605.1540	572.3517	(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	47.4743	47.5567	47.6377	48.0219	48.0944	48.4352	48.4352	48.4988	48.3033	48.0944	47.9478	47.7955	
alpha	4.1650	4.1704	4.1758	4.2015	4.2063	4.2290	4.2290	4.2333	4.2202	4.2063	4.1965	4.1864	
util living area	0.9906	0.9799	0.9559	0.8839	0.7463	0.5613	0.4180	0.4759	0.7235	0.9282	0.9817	0.9924 (86)	
MIT	19.4124	19.6680	20.0286	20.4876	20.8099	20.9563	20.9900	20.9831	20.8763	20.4309	19.8397	19.3672 (87)	
Th 2	20.0077	20.0093	20.0108	20.0179	20.0192	20.0255	20.0255	20.0266	20.0231	20.0192	20.0165	20.0137 (88)	
util rest of house	0.9883	0.9750	0.9451	0.8568	0.6941	0.4856	0.3285	0.3807	0.6501	0.9052	0.9765	0.9906 (89)	
MIT 2	18.5653	18.8189	19.1726	19.6112	19.8909	20.0039	20.0224	20.0209	19.9525	19.5705	18.9963	18.5249 (90)	
Living area fraction									fLA = Living area / (4) =			0.2848 (91)	
MIT	18.8065	19.0607	19.4164	19.8608	20.1526	20.2751	20.2979	20.2949	20.2156	19.8155	19.2365	18.7648 (92)	
Temperature adjustment												0.0000	
adjusted MIT	18.8065	19.0607	19.4164	19.8608	20.1526	20.2751	20.2979	20.2949	20.2156	19.8155	19.2365	18.7648 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	594.1370	699.5203	772.7409	818.2446	740.5073	536.8095	358.2371	374.6189	545.7568	622.1687	587.5801	565.0757 (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	1445.7324	1408.8236	1282.8421	1079.9077	831.5346	554.3660	361.2271	379.9681	599.0270	906.5870	1197.5899	1441.7814 (97)	
Space heating kWh	633.5870	476.6518	379.5153	188.3975	67.7243	0.0000	0.0000	0.0000	0.0000	211.6072	439.2071	652.2690 (98a)	
Space heating requirement - total per year (kWh/year)												3048.9591	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)	
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	633.5870	476.6518	379.5153	188.3975	67.7243	0.0000	0.0000	0.0000	0.0000	211.6072	439.2071	652.2690 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												3048.9591	
Space heating per m ²												33.3950 (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													

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Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	918.2288	722.8610	741.4237	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.8979	0.9409	0.9154	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	824.4563	680.1259	678.6962	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	1192.9031	1137.4169	1031.1012	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	265.2817	340.2244	262.1893	0.0000	0.0000	0.0000	0.0000 (104)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	FC = cooled area / (4) =			1.0000 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	66.3204	85.0561	65.5473	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling requirement									0.0000	0.0000	0.0000	0.0000 (107)
Energy for space heating												216.9238 (107)
Energy for space cooling												33.3950 (99)
Total												2.3759 (108)
Fabric Energy Efficiency (TFEE)												35.7709 (109)
												35.8 (109)