SAP 2005 WORKSHEET FOR SOLAR WATER HEATING (Version 9.80, October 2005)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLANCE

calculated by program SAP Calculator version 3.3, printed on 13, October 2009, at 14:38:53
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Applicable regulations: England and Wales
The results of the calculation should not be accepted without first checking the input data

Example Solar Water Project

1. Overall dwelling dimensions	Area (m^2)	Av. storey height (m)	Volume (m^3)	
Ground Floor	40.00	2.40	96.00	
First Floor	40.00	2.60	104.00	
Total floor area	80.00			(5)
Dwelling volume (m^3)			200.00	(6)

2. Ventilation rate		m^3 per hour		
Number of chimneys	0 x 40	0		(7)
Number of flues	0 x 20	0		(8)
Number of fans or passive vents	3 x 10	30		(9)
Number of flueless gas fires	0 x 40	0		(9a)
Infiltration due to chimneys, flues and fans			0.15	(10)

Pressure test	No Compliance Only			
Q50	15.0			
Infiltration rate			0.90	(19)
Number of sides sheltered			2	(20)
Shelter factor			0.85	(21)
Adjusted infiltration rate			0.77	(22)
(Natural ventilation)				
Effective air change rate			0.79	(25)

3. Heat losses and heat loss parameter				
Element	Area (m^2)	U-value (W/m^2K)	A x U (W/K)	
Door - Half Glazed	1.85	1.80	3.33	
Window	4.00	(1.80)1.68	6.72	
Window	4.00	(1.80)1.68	6.72	
Window	6.00	(1.80)1.68	10.07	
Floor	40.00	0.84	33.60	
Wall	74.15	0.30	22.25	
Roof	40.00	0.40	16.00	
Total area of elements	170.00			(32)
Fabric heat loss			98.68	(33)
Thermal bridges (Global Y-value)			15.30	(34)
Total fabric heat loss			113.98	(35)
Ventilation heat loss			52.31	(36)
Heat loss coefficient			166.29	(37)
Heat loss parameter (HLP)			2.08	(38)

4. Water heating energy requirements			
		kWh/year	
Energy content of heated water		1,846	(39)

Distribution loss			326	(40)
Cylinder volume			150	(43)
Cylinder loss factor (kWh/litre/day)			0.0152	(44)
Volume factor			0.928	(44a)
Temperature factor			0.54	(44b)
Energy lost from water storage, kWh/year			417	(45)
Energy lost from cylinder in kWh/year			417	(47)
Primary circuit loss			360	(48)
Combi loss			0	(49)
Solar input			-815	(50)
Output from water heater			2,134	(51)
Heat gains from water heating			1,344	(52)

5. Internal gains

			Watts	
Lights, appliances, cooking and metabolic			480	(53)
Reduction in lighting gains			-16	(53a)
Additional gains (Table 5a)			10	(53b)
Water heating			153	(54)
Total internal gains			627	(55)

6. Solar gains

Orientation			Gains (W)	
North			35	(56)
East			88	(58)
West			59	(62)
		total:	182	(65)
Total gains			809	(66)
Gain/loss ratio			4.86	(67)
Utilisation factor			0.975	(68)
Useful gains			789	(69)

7. Mean internal temperature

			°C	
Mean temperature of the living area			18.84	(70)
Temperature adjustment from Table 4e			0.00	(71)
Adjustment for gains			0.15	(72)
Adjusted living area temperature			18.99	(73)
Temperature difference between zones			1.58	(74)
Living area fraction			0.300	(75)
Rest-of-house area fraction			0.700	(76)
Mean internal temperature			17.88	(77)

8. Degree-days

Temperature rise from gains			4.74	(78)
Base temperature			13.14	(79)
Degree-days			1,591.0	(80)

9a. Energy requirements			kWh/year	
Space heating requirement (useful)			6,350	(81)
Fraction of heat from secondary system	0.10			(82)
Efficiency of main heating system	86.0			(83)
Efficiency of secondary heating system	100			(84)
Space heating fuel (main)			6,645	(85)
Space heating fuel (secondary)			635	(85a)
Efficiency of water heater		86.0		(86)
Water heating fuel			2,481	(86a)
Electricity for pumps and fans			175	(87)

10a and 11a do not apply

12a. Carbon dioxide emissions	Energy (kWh/year)	Emission factor	Emissions (kg/year)	
Space heating, main - box (85)	6,645	0.194	1,289	(101)
Space heating, secondary - box (85a)	635	0.422	268	(102)
Water heating	2,481	0.194	481	(103)
Space and water heating			2,038	(107)
Pumps and fans - box (87)	175	0.422	74	(108)
Electricity for lighting	623	0.422	263	(109)
Total kg/year			2,375	(112)
Dwelling Carbon Dioxide Emission Rate (DER)			**29.69**	(113)