

SAP 2005 and Code For Sustainable Homes Data



- 1 All Gledhill thermal stores comply with the WMA specification.
- 2 The heat losses from thermal stores should not be directly compared with heat losses from unvented or vented cylinders because they are treated differently in SAP. The SAP calculator takes account of the type of store and various correction factors are included to reflect the different ways that the hot water and heating operates.
- 3 Because the store heating is separately time controlled, the temperature factor of 0.89 should be multiplied by a factor 0.81 as per table 2b in SAP 2005. ie $0.89 \times 0.81 = 0.721$.
- 4 Because the BoilerMate OV is an integrated thermal store, a temperature adjustment of -0.1°C should be applied as table 4e, SAP 2005 to compensate for marginally higher losses when compared to a cylinder.
- 5 Because these appliances are provided with separate time control of the domestic hot water the heat loss factor of 0.6 should be multiplied by a factor of 0.9 as per table 2b in SAP 2005. ie $0.6 \times 0.9 = 0.54$.

THERMAL STORES										
Appliance Name	Model	Appliance Type	Storage Volume (Litres)	Declared Heat Loss ⁽²⁾ (kWh/24h)	Independant Hot Water Time Control	Independant Heating Time Control	Temperature Factor (Vessel Heat Loss)	Primary Circuit Losses (kWh/year)	Water Heating Efficiency	Temperature Adjustment ($^{\circ}\text{C}$)
BoilerMate OV ⁽¹⁾	BMA 125 OV	Integrated Thermal Store	132	2.154	Yes	Yes	0.721 ⁽³⁾	Insulated Pipework: 280 Uninsulated Pipework: 470	SEDBUK Value Of Boiler	-0.1 ⁽⁴⁾
	BMA 145 OV		140	2.196						
	BMA 185 OV		147	2.283						
	BMA 215 OV		164	2.311						
	BMA 225 OV		186	2.346						
BoilerMate SP ⁽¹⁾	BMA 120 SP	Hot Water Only Thermal Store	132	2.154	Yes	Yes	0.721 ⁽³⁾	Insulated Pipework: 280 Uninsulated Pipework: 470	SEDBUK Value Of Boiler	0
	BMA 140 SP		140	2.196						
	BMA 180 SP		147	2.283						
	BMA 200 SP		164	2.311						
	BMA 220 SP		186	2.346						
PulsaCoil ⁽¹⁾	PCA 145	Off Peak Electric Hot Water Only Thermal Store	147	1.890	Yes	N/A	0.721 ⁽³⁾	N/A	100%	N/A
	PCA 185		164	1.995						
	PCA 215		186	2.051						
	PCA 235		210	2.079						
PulsaCoil Eco ⁽¹⁾	PCA 100E	Off Peak Electric Hot Water Only Thermal Store	100	1.019	Yes	N/A	0.721 ⁽³⁾	N/A	100%	N/A
	PCA 120E		125	1.118						
	PCA 150E		150	1.300						
	PCA 180E		175	1.463						
	PCA 220E		200	1.569						
SAP 2005 References	Box Reference		[41]	[44b]		[41a]	[48]	[86]	[71]	
	Table/Appendix			Table 2b		Table 2b	Table 3	Table 4a	Table 4e	

UNVENTED CYLINDERS

Appliance Name	Model	Appliance Type	Storage Volume (Litres)	Declared Heat Loss ⁽²⁾ (kWh/24h)	Independant Hot Water Time Control	Independant Heating Time Control	Temperature Factor (Vessel Heat Loss)	Primary Circuit Losses (kWh/year)	Water Heating Efficiency	Temperature Adjustment (°C)
XtraLite Direct	D90	Direct Unvented Cylinder	90	0.80	No	No	0.6	N/A	100%	N/A
	D120		120	1.00						
	D150		150	1.20						
	D180		180	1.40						
	D210		210	1.60						
	D250		250	1.75						
	D300		300	1.93						
XtraLite Indirect	IND90	Indirect Unvented Cylinder	90	0.80	No	No	0.6	Insulated Pipework: 360 Uninsulated Pipework: 610	SEDBUK Value Of Boiler	N/A
	IND120		120	1.00						
	IND150		150	1.20						
	IND180		180	1.40						
	IND210		210	1.60						
	IND250		250	1.75						
	IND300		300	1.93						
XtraLite Pre-Plumbed Indirect	IND120PP	Indirect Unvented Cylinder	120	1.00	Yes	Yes	0.54 ⁽⁵⁾	Insulated Pipework: 360 Uninsulated Pipework: 610	SEDBUK Value Of Boiler	N/A
	IND150PP		150	1.20						
	IND180PP		180	1.40						
	IND210PP		210	1.60						
	IND250PP		250	1.75						
	IND300PP		300	1.93						
SAP 2005 References	Box Reference		[41]	[44b]		[41a]	[48]	[86]	[71]	
	Table/Appendix			Table 2b		Table 2b	Table 3	Table 4a	Table 4e	

BOILERS

Appliance Name	Model	Appliance Type	SEDBUK		Primary Storage Vessel Data			NO _x Levels
			Efficiency (%)	Band	Volume (Litres)	Declared Heat Loss ⁽²⁾ (kWh/24h)	Temperature Factor (Vessel Heat Loss)	
Gledhill HE Gas Boiler	GB10	Wall Mounted Balanced Flue Condensing Boiler	90.2	A				53mg/kWh (Class 5 to BSEN483)
	GB15		90.6	A				
	GB20		90.4	A				48mg/kWh (Class 5 to BSEN483)
	GB25		90.4	A				
	GB30		90.3	A				
Gledhill Combi Gas Boiler	GB35C	Modulating Combination Boiler Instantaneous	90.8	A				48mg/kWh (Class 5 to BSEN483)
GulfStream A-Class Storage Combi Gas Boiler	12/OV & 12/SS	Modulating Storage Combination Boiler	90.1	A	95	1.934	N/A	<75mg/kWh (Class 5 to BSEN483)
	20/OV & 20/SS		90.0	A				
	30/OV & 30/SS		89.8	B				
ElectraMate A-Class ⁽¹⁾ Electric Boiler	EMA 225/6/E10	Direct Acting Electric Boiler and Off Peak Electric Hot Water Only Thermal Store	100	N/A	200	2.28	0.721 ⁽³⁾	N/A
	EMA 225/9/E10							
SAP 2005 References	Box Reference		[83] [86]				[41]	[41a]
	Table/Appendix		Table 4a				Table 2b	

ALTERNATIVE ENERGY APPLIANCES

Appliance Name	Model	Appliance Type	Volume (Litres)		Declared Heat Loss ⁽²⁾ (kWh/24h)	Independent Hot Water Time Control	Independent Heating Time Control	Temperature Factor (Vessel Heat Loss)	Primary Circuit Losses (kWh/year)	Water Heating Efficiency	Temperature Adjustment (°C)	Max Property Floor Area (m ²)
			Total (Vt)	Solar (Vs)								
BoilerMate OV Solar	BMA 215 OV SOL	Integrated Thermal Store	164	82	2.02	Yes	Yes	0.721 ⁽³⁾	Insulated Pipework: 280 Uninsulated Pipework: 470	SEDBUK Value Of Boiler	-0.1 ⁽⁴⁾	80
	BMA 225 OV SOL		188	93	2.06							100
	BMA 235 OV SOL		225	109	2.11							130
	BMA 245 OV SOL		278	123	2.17							170
	BMA 265 OV SOL		310	148	2.23							220
	BMA 285 OV SOL		360	168	2.30							280
BoilerMate SP Solar	BMA 200 SP SOL	Hot Water Only Thermal Store	164	82	2.02	Yes	Yes	0.721 ⁽³⁾	Insulated Pipework: 280 Uninsulated Pipework: 470	SEDBUK Value Of Boiler	0	80
	BMA 220 SP SOL		188	93	2.06							100
	BMA 240 SP SOL		225	109	2.11							130
	BMA 260 SP SOL		278	123	2.17							170
	BMA 280 SP SOL		310	148	2.23							220
	BMA 300 SP SOL		360	168	2.30							280
PulsaCoil Solar	PCA 200 SOL	Off Peak Electric Hot Water Only Thermal Store	164	64	2.02	Yes	N/A	0.721 ⁽³⁾	N/A	100%	N/A	50
	PCA 220 SOL		186	76	2.06							70
	PCA 240 SOL		210	87	2.11							90
	PCA 260 SOL		260	103	2.17							120
Xtralite Solar Direct	SOL 180d	Off Peak Electric Direct Unvented Cylinder	180	60	1.40	No	N/A	0.6	N/A	100%	N/A	45
	SOL 210d		210	70	1.60							60
	SOL 250d		250	84	1.75							80
	SOL 300d		300	100	1.93							110
Xtralite Solar Indirect	SOL 180i	Indirect Unvented Cylinder	180	60	1.40	No	No	0.6	Insulated Pipework: 360 Uninsulated Pipework: 610	SEDBUK Value Of Boiler	0	45
	SOL 210i		210	70	1.60							60
	SOL 250i		250	84	1.75							80
	SOL 300i		300	100	1.93							110

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ALTERNATIVE ENERGY APPLIANCES CONTINUED

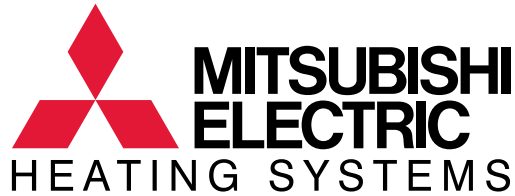
Appliance Name	Model	Appliance Type	Volume (Litres)		Declared Heat Loss ⁽²⁾ (kWh/24h)	Independent Hot Water Time Control	Independent Heating Time Control	Temperature Factor (Vessel Heat Loss)	Primary Circuit Losses (kWh/year)	Water Heating Efficiency	Temperature Adjustment (°C)	Max Property Floor Area (m ²)
			Total (V _T)	Solar (V _s)								
BoilerMate Heat Pump *	BMA 180 HP-DEM	Indirect Unvented Cylinder	145		1.69	Yes	Yes	0.54 ⁽⁵⁾	Insulated Pipework: 360 Uninsulated Pipework: 610	250%	0	
	BMA 210 HP-DEM		171		1.92							
	BMA 240 HP-DEM		215		2.30							
BoilerMate mCHP SP	BMA 225 mCHP SP	Integrated Thermal Store	186		2.06	Yes	Yes	0.721 ⁽³⁾	Insulated Pipework: 280 Uninsulated Pipework: 470	v/hs for 238 days v/sum for 127 days	-0.1	
	BMA 235 mCHP SP		225		2.11							
SAP 2005 References	Cell Reference				[41]			[41a]	[48]	[86]	[71]	
	Table/Appendix							Table 2b	Table 3	Table 4a	Table 4e	
* See information on Page 4 for details of the Mitsubishi / Gledhill Heat Pump Package												

SOLAR COLLECTORS (PANELS)

Solar Panel Types	Ref	Net (Aperture) Area/Panel (m ²)	Zero Loss Collector Efficiency η_0 (%)	Collector Heat Loss Coefficient a_1 (W/m ² k)
In Roof Glazed Flat Plate Collector	IRCP	2.28	0.78	3.796
On Roof Glazed Flat Plate Collector	ORCP	2.20	0.77	3.494
On Roof Evacuated Tube Collector	ORET	1.59	0.605	0.85

Notes

- The overshadowing factor shall be assessed and entered on the basis of Table H3. In the absence of a detailed site information a preliminary assessment can be made using an overshadowing factor of 1.0 (<20%).
- The annual solar radiation in kWh/m² for the actual angle (tilt) and orientation of the solar collector should be entered from Table H2.



Entering the heat pump package into SAP

SAP 2005 currently only allows air source heat pumps with a maximum Coefficient of Performance (COP) of 2.5 to be entered (SPF of 250). When adjusting the space heating or DHW efficiency choose one of the following from Table 4C to suit the systems being installed.

- Heat pump with under floor heating – 1.0
- Heat pump with radiators and load or weather compensation 0.75 (weather compensation controls are built in to the BMA HP-DEM appliance)
- Heat pump supplying all DHW – 0.7

The space heating and DHW electric boost heaters fitted to the BMA HP-DEM appliance are designed for emergency operation only and there is no in-line direct electric heater fitted to the heat pump.

However, independant testing by BRE in 2007 has demonstrated that the Gledhill / Mitsubishi Electric package achieves the high COP performance quoted in the table below. This data is currently being considered by BRE for inclusion within SAP under Appendix Q.

AIR SOURCE HEAT PUMP		
For Properties Up To 8kW Overall Design Heat Loss		
Annual COP For Hot Water to 55°C	3.47	
Annual COP For Hot Water to 60°C	3.22	
Annual Average Central Heating COP	Low Temp (35°C) Underfloor Heating	Medium Temp (55°C) Heating Circuit (Radiator Circuit Oversized by 20%)
	4.38	2.48
For Properties Up To 13kW Overall Design Heat Loss		
Annual COP For Hot Water to 55°C	3.47	
Annual COP For Hot Water to 60°C	3.22	
Annual Average Central Heating COP	Low Temp (35°C) Underfloor Heating	Medium Temp (55°C) Heating Circuit (Radiator Circuit Oversized by 20%)
	3.86	2.29

IMPROVING SAP RATINGS - LOAD, WEATHER AND DELAYED START CONTROLS.

Table 4C of SAP 2005 allows efficiency adjustments to the space and water heating seasonal efficiency (SEDBUK) of listed boilers being entered into box 83 when certain types of approved energy efficient compensators are being used. **A +2% efficiency increase with gas boilers and +1% with oil / LPG boilers should be added when using these with Gledhill products where indicated in the table below.**

COMPENSATORS

Appliance Name	Load Compensator	Direct Acting Weather Compensator ⁽¹⁾	Indirect Acting Weather Compensator ⁽²⁾
BoilerMate OV	Yes		Yes
BoilerMate SP	Yes	Yes	Yes
Gulfstream	Yes	Yes	Yes
ElectraMate	Yes		Yes
BoilerMate OV Solar	Yes		Yes
BoilerMate SP Solar	Yes	Yes	Yes
BoilerMate HP-DEM		Yes ⁽³⁾	
Xtralite Indirect	Yes	Yes	Yes
Xtralite Pre-Plumbed Indirect	Yes	Yes	Yes
Xtralite Solar Indirect	Yes	Yes	Yes

Notes

1. The direct acting compensator adjusts the central heating flow temperature from the boiler.
2. The indirect acting compensator adjusts the central heating flow temperature by means of a 3 port blending valve. This MUST only be installed in the heating circuit.
3. The BMA HP-DEM appliance is supplied complete with a remote sensor and built in weather compensator.

NOTE: The adjustments are mutually exclusive and do not accumulate.

DELAYED (OPTIMUM) START ROOM THERMOSTATS

In the same way Table 4e allows a reduction in the energy used for space heating if a delayed (optimum) start room thermostat is being used. To do this, reduce the mean internal temperature of the living area being entered into box 71 (from table 8) by -0.15°C. These types of controllers can be used with all Gledhill Water Storage products other than the BoilerMate A-Class HP-DEM (which is already supplied complete with weather compensation).

INSULATION DETAILS - POL1 DATA

Description ⁽¹⁾	Insulation Materials Proposed (or none)	Unfoamed (U) / Foamed (F) / Installed Using Propellants (P)	Manufacturer	Product Name	Global Warming Potential (if foamed)	Name Of Blowing Agent (where installed using propellant)	GWP Of Blowing Agent (if present)	Reference To Literature Confirming The GWP (if foamed or installed using a propellant) ⁽²⁾	Ozone Depletion Potential (ODP)
All Hot Water Appliances	Polyurethane	F	Gledhill	Isofoam RM DP 6388W	1	N/A	N/A	Yes	Zero

Notes

1. Applies to all Gledhill Water Storage appliances which incorporate a thermal store or unvented cylinders ie. all appliances other than the Gledhill HE and Combi Boiler.
2. See product literature available at www.gledhill.net or ask for a copy of our Environmental Policy.