SAP Data Verification and Completion Checklist (v.1)

SAP 2009

SAP 2009 calculation check by:		Date:	
Completion inspection by:		Date:	

Notes: SAP 2005 is used to demonstrate compliance **from 1 May 2007 until 30 September 2010** and to produce EPCs **prior to 17 April 2011**. SAP 2009 is used to demonstrate compliance **from October 2010** and to produce EPCs **from 17 April 2011.** The SAP procedure is applicable to self-contained dwellings. Under the 'Where' column, for example, [1a] refers to the box number in the SAP calculation.

	SAP 2009 Data Verification Checklist	*Where*	Yes	No	Notes
1	Is software on list for 'Approved software for SAP 2009'? *Note see link at* http://www.projects.bre.co.uk/sap2009/	*Input sheets*	☐	☐	
2	Are full input details, and DER and TER calculations, provided? *Note the Compliance Report & Summary of Compliance/Input sheets detail data for SAP sections 1-10.*		☐	☐	
3	Is DER less than TER?	*Input sheets*	☐	☐	
4	Is location shown as Scotland?		☐	☐	
5	Is dwelling type and detachment correct?		☐	☐	
6	Do floor area dimensions match plan drawings for ground, first, second, other and total floor area (TFA)? *Note dimensions refer to the inner surfaces of the elements bounding the dwelling.*	*[1a to 1n and 4]*	☐	☐	
7	Do storey height dimensions match section drawings? *Note storey height is the total height between the ceiling surface of a storey and the ceiling surface of the storey below. If the room height varies (e.g. room-in-roof), the storey height is an average based on the volume of the space and the internal floor area (plus thickness of floor, if appropriate).*	*[2a to 2n]*	☐	☐	
8	Is living area fraction correct? *Note the living area fraction is the floor area of the living area (the room marked on a plan as the lounge or living room, or the largest public room, together with any rooms not separated from it) divided by the total floor area. Living area does not extend over more than one storey.* **Typical values: 0.05 – 0.2**	*[91]*	☐	☐	
9	Is dwelling orientation correct and matches location/site plans and elevations?	*Input sheets*	☐	☐	
10	Is solar access (overshading) factor correct? *Note solar access factor describes the extent to which radiation is prevented from entering the building by nearby obstacles.* **Typical values: 20%-60%, less than 20% is not appropriate.**	*Input sheets*	☐	☐	
11	Are number, area and orientation of openings (doors, windows and rooflights) correct? *Note for TER, all glazing orientated east/west. For DER, east/west orientation of glazing may be assumed if the actual orientation is not known (typically for the 'worst case' design SAP calculation, but not for a completion SAP calculation, where the dwelling has been constructed).*	*Input sheets & [26 to 32]*	☐	☐	
12	Do the U-values in the specification, the U-value calculations and the SAP calculation correspond for: *Note U-values may be corrected for sheltering (for example, elements adjacent to unheated space, and stairwells and access corridors in flats) and the effective window U-value may take into account the assumed use of curtains (see 3.3 in SAP 2009).*				
	a) Floor(s) U-value(s)?	*[26 to 32]*	☐	☐	
	b) Wall(s) U-value(s)?		☐	☐	
	c) Roof(s) U-value(s)?		☐	☐	
	d) Glazing and doors U-values? *Note certification required for glazing/doors with U-values less than Package value (see 6.1.2).*		☐	☐	
	e) Is a thermally separated conservatory included in the design? *Note for a conservatory that is thermally separated, the SAP calculation should be undertaken as if it were not present.*	*Input sheets*	☐	☐	
13	Is a (non-repeating) thermal bridging breakdown calculation provided and correct? *Note for DER, the three options for thermal bridging at junctions (see 6.2.3) are:* *1) a conservative default y-value (total heat loss due to thermal bridging at junctions) of* **0.15** *is used* (**this can be checked by dividing box 36 by box 31 to get 0.15**),	*[36]*	☐	☐	

Disclaimer: this simplified checklist procedure is designed for use in checking relatively uncomplicated dwelling SAP situations and is not intended to replace or relieved obligations to check all the requirements detailed in the relevant guidance.

	2) for construction **in accordance 'Accredited Construction Details' or 'Default values'**, *the total heat loss due to thermal bridging at each junction is calculated using:* *ψ-value 1(psi value, the heat loss due to thermal bridging at junction 1) multiplied by length (of the thermal bridging element of junction 1) = $\psi_1 \times l_1$.* *The calculation is repeated for all the junctions ($\psi_2 \times l_2$), ($\psi_3 \times l_3$) etc. These individual totals are then added up to get a total for all the junctions = ($\psi_1 \times l_1$) + ($\psi_2 \times l_2$) + ($\psi_3 \times l_3$) etc.* *Note that **accredited or default ψ-values are available in Appendix K in SAP 2009**. Requesting a breakdown of the calculation in box 36 may help check which ψ-values have been used.* *3) use a y-value derived from numerical modelling of individual ψ-values.*				
14	**Is air-tightness (air permeability) correct?** *Note for DER, there is no air-tightness backstop, but 10m3/m2.h@50Pa or better (i.e. less) is recommended. Designing and constructing in accordance with the principles set out in 'Accredited Construction Details (Scotland) 2010' will assist in limiting air infiltration, but due to detailing and workmanship, it is difficult to achieve a specified air infiltration rate with any degree of accuracy (6.2.4). Under 6.2.5, where an air-tightness of 15m³/m².h @50Pa is stated, testing need not be carried out. Air-tightness values < 5m³/m².h@50Pa may give rise to problems, and so a mechanical ventilation system should be used (see 3.14.10). For TER, the air-tightness is 7m3/m2.h@50Pa.*	[17]	☐	☐	
15	**Is ventilation system detailed correctly?** *Note as an example: natural with intermittent extract fans.*		☐	☐	
	a)	No of chimneys and flueless gas fires correct? *Note a chimney is defined as a vertical duct of diameter 200mm or more.*	[6a & 7c]	☐	☐	
	b)	No of open flues correct? *Note that vertical ducts with diameter less than 200mm should be counted as flues.*	[6b]	☐	☐	
	c)	No of intermittent fans?	[7a]	☐	☐	
	d)	No of passive vents?	[7b]	☐	☐	
16	**Is the number of sheltered sides correct?** *Note a side of a building is sheltered if there are adjacent buildings or hedges which effectively obstruct the wind on that side of the building. **Typical values for new dwellings: 2 sides sheltered. Shelter factor = 1 – (0.075 x no of sheltered sides) = 1 – 0.15 = 0.85 for 2 side sheltered.***	[19 & 20]	☐	☐	
17	**Is thermal mass parameter (TMP) breakdown calculation provided and correct?** *Note Thermal Mass Parameter (TMP) is the sum of (individual area x individual heat capacity) for all elements (including internal walls) divided by total floor area. Heat capacities for different elements are in Table 1e of SAP 2009. **Indicative TMP values: Low 100, Med 250, High 450.***	[35]	☐	☐	
18	**Under TER, is the correct 'Main Space Heating system fuel' Package selected?** *Note see 6.1.2. For gas and oil, boilers, efficiency values detailed are SEDBUK (2005). Equivalent values for SEDBUK (2009) are: Natural gas and LPG - 89%, Oil - 90%. Additionally, the notional boiler efficiency copies the adjustments applied to the DER boiler efficiency (see 22 b) below).*		☐	☐	
19	Under data input for Main (Space) Heating and the specification:				
	a)	Are the heating type, heat emitter, main heating fuel, boiler type, brand name, model, type, flue type, burner control, keep-hot facility and keep-hot control detailed and matching the specification? *Note as an example for mains gas: wet system with radiators, radiators, mains gas (1), combi, Brand Name, Model, 2 combi, room-sealed fan assisted, variable, unknown, none (see Sections 6.3 to 6.6, and Domestic Building Services Compliance Guide for further guidance).*	*Input sheets*	☐	☐	
	b)	Are the mains heating controls, boiler interlock, space heating zones, water heating zones (not required for a combi), time controls for space and water heating, and temperature controls detailed and matching the specification? *Note controls include room thermostat, time switch, programmer, programmable room thermostat, delayed start thermostat, thermostatic radiator valve (TRV), cylinder thermostat, flow switch, interlock, bypass, energy manager, time and temperature zone controls, weather compensator, load compensator. An interlock (for oil and gas boilers) is not a physical device, but are system controls. A boiler system with no cylinder thermostat has no interlock. Additionally, a boiler system with no room thermostat has no interlock. TRVs alone do not perform the boiler interlock function (a separate room thermostat is required in one room).*	*Input sheets*	☐	☐	
20	Under data input for Secondary Heating, is the secondary heating detailed and matching in the specification?	*Input sheets*	☐	☐	
21	Under data input for Water Heating, is the water heating detailed and matching in the specification? *Note if solar water heating is specified, see 6.3.6. Additionally, a copy of the calculation used in H1 in Appendix H of SAP 2009 requires to be submitted and checked. Where hot water is provided by a heat pump, see guidance in Appendix N in SAP 2009.*	*Input sheets*	☐	☐	
22	Under Section 9 Energy Requirements of the DER:				
	a)	Is the fraction of heat supplied by Secondary Heating correct? *Note see Table 11 in SAP 2009.*	[201]	☐	☐	

Disclaimer: this simplified checklist procedure is designed for use in checking relatively uncomplicated dwelling SAP situations and is not intended to replace or relieved obligations to check all the requirements detailed in the relevant guidance.

				Yes	No	Notes
	b)	Is the % efficiency plus adjustment of the Main Space Heating system correct? *Note for an oil or gas boiler, the boiler efficiency may be obtained from the **Product Characteristics Database** (see www.boilers.org.uk). If a new boiler is not in the database, certified manufacturer's data consisting of a winter and a summer seasonal efficiency should be used (see Appendix D of SAP 2009 for details). If there is no database entry or manufacturer's data, an indicative seasonal efficiency should be taken from Table 4b for SAP 2009. The efficiency **is the winter seasonal efficiency** from the database or Table 4b, increased if appropriate by an increment from Table 4c. For other boiler types, see Section 9 of SAP 2009.*	[206]	☐	☐	
	c)	Is the efficiency for the secondary heating system correct? *Note the secondary heating system is based upon a room heater (see Table 4a in SAP 2009). Examples include a gas fire, a chimney and hearth for an open fire, and a wall-mounted electric fire. Portable heaters are not counted.*	[208]	☐	☐	
23		Under Section 9 Energy Requirements of the DER and in the specification:				
	a)	Is a minimum of 75% low energy light fittings detailed? *Note under 6.5.1, a minimum of 75% of the fixed light fittings and lamps installed within a dwelling should be low energy type, for example tubular fluorescent and compact fluorescent fittings (CFL's). Fixed light fittings include only the main light sources to a room and not display or feature lighting such as picture lights, kitchen wall cupboard lights, or over mirror lights. A light fitting may contain one or more lamps operated by the same switch can be counted as one fitting. Note that lighting provision (and associated carbon emissions) is calculated in SAP 2009 directly from the total floor area (TFA).*	Input sheets	☐	☐	
	b)	Is the percentage of low energy light fittings detailed greater than 75%? *Note if the percentage of low energy lights is greater than 75%, this will significantly affect the SAP calculation and therefore **the lighting must be inspected at the time of completion**.*		☐	☐	
24		Are the emission factors correct? *Note see Table 12 in SAP 2009.* *When a stove is used as the primary or secondary form of heating, to ensure the correct EI rating when **0.008** is used as the emission factor, the stove must be manufactured **to operate solely for the burning of wood logs**. If the stove is capable of burning multifuels, the emissions factors will be considerably higher (for example, the emission factor house coal = 0.301, which is 37 times higher than for wood logs). A log store should also be provided.*	[261 to 264 & 385]	☐	☐	
Notes:						

		SAP 2009 Completion checklist	Yes	No	Notes
1		Does the completion SAP pass the check detailed above?	☐	☐	
2		For the completion inspection:			
	a)	Is the Total Floor Area (TFA) altered?	☐	☐	
	b)	Is the living area fraction altered?	☐	☐	
	c)	Is the 'rating' of glazing correct?	☐	☐	
	d)	Is the installed boiler's efficiency the same or better than originally approved?	☐	☐	
	e)	Is the primary heating system the same as originally approved (for wood log burning stoves, see 24 above)?	☐	☐	
	f)	Is the secondary heating system the same as originally approved (for wood log burning stoves, see 24 above)?	☐	☐	
	g)	Are all approved space and water heating controls present and working?	☐	☐	
	h)	Specifically, is the boiler interlock system present (see 19 b) above)?	☐	☐	
	i)	Is the thickness of insulation of hot water cylinder correct (where appropriate)?	☐	☐	
	j)	Is insulation thickness correct, for example serving the roofspace?	☐	☐	
	k)	Are the specified type and number of low energy lights fitted?	☐	☐	
3		Does the submitted EPC correspond to the completion SAP 2009 calculation?	☐	☐	
Notes:					