

SAP Data Verification and Completion Checklist (v.1)

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. SAP 2012 will apply from October 2015. 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		Yes	No	Notes
1	Is software on list for 'Approved software for SAP 2009'?				
	Note see link at <u>http://www.projects.bre.co.uk/sap2009/</u>				
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?				
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	[1a to			
	total floor area (TFA)?	1n			
	Note dimensions refer to the inner surfaces of the elements bounding the dwelling.	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	[2a		П	
	the storey below. If the room height varies (e.g. room-in-roof), the storey height is an average based	to 2n]			
8	on the volume of the space and the internal floor area (plus thickness of floor, if appropriate).				
0	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)	[91]			
	divided by the total floor area. Living area does not extend over more than one storey.	2 3	_	_	
	<i>Typical values:</i> 0.05 – 0.2	Input			
9	Is dwelling orientation correct and matches location/site plans and elevations?				
10	Is solar access (overshading) factor correct?	Input			
	Note solar access factor describes the extent to which radiation is prevented from entering the				
	uilding by nearby obstacles. Typical values: 20%-60%, less than 20% is not appropriate.				
11	correct?				
	Note for TER, all glazing orientated east/west. For DER, east/west orientation of glazing may be		Ш	ш	
	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).				
12	Do the U-values in the specification, the U-value calculations and the SAP				
12	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)?				
	b) Wall(s) U-value(s)?	[26 to			
	c) Roof(s) U-value(s)?	32]			
	d) Glazing and doors U-values?	- 1			
	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?	Input		_	
	Note for a conservatory that is thermally separated, the SAP calculation should be undertaken as	sheets		Ш	
	if it were not present.				
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),				
					ı

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	2) for construction in accordance 'Accredited Construction Details (ACDs)' or 'Default values' (or some mix and match combination of both), the total heat loss due to thermal bridging at each				
	<i>junction is calculated using:</i> ψ <i>-value 1(psi value, the heat loss due to thermal bridging at junction 1)</i> multiplied by length (of the thermal bridging element of junction 1) = $\psi_1 x l_1$.				
	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 default ψ -values are available in Appendix K in SAP 2009. Accredited ψ -values are				
	available online from the BSD website (see ACDs for applications submitted on or after October 1,				
	2010, and ACDs (Scotland) (2007) for applications submitted before this date). ACDs (Scotland) 2010 indicates that other sources of psi values can be used, providing they have been assessed or				
	independently verified by a specialist notified body or UKAS accredited organisation. Requesting a				
	breakdown of the calculation in box 36 may help check which psi values have been used. The details used for the total heat loss calculation should match the plans submitted.				
	<i>The definits used for the fold near loss calculation should match the plans submitted.</i> <i>3) use a y-value derived from numerical modelling of individual ψ-values.</i>				
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	[17]			
	workmanship, it is difficult to achieve a specified air infiltration rate with any degree of accuracy	[17]	ш		
	(6.2.4). Under 6.2.5, where an air-tightness of $15m^3/m^2$.h @50Pa is stated, testing need not be carried out. Air-tightness values $< 5m^3/m^2$.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.				
15	Is ventilation system detailed correctly?				
	Note as an example: natural with intermittent extract fans. a) No of chimneys and flueless gas fires correct?	[6a &	_	_	
	Note a chimney is defined as a vertical duct of diameter 200mm or more.	7c]			
	b) No of open flues correct?	[6b]			
	Note that vertical ducts with diameter less than 200mm should be counted as flues.				
	c) No of intermittent fans?	[7a]	_		
10	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	[19 &			
	obstruct the wind on that side of the building. Typical values for new dwellings: 2 sides sheltered.	20]			
17	Shelter factor = $1 - (0.075 \times no \text{ of sheltered sides}) = 1 - 0.15 = 0.85 \text{ for } 2 \text{ side sheltered.}Is thermal mass parameter (TMP) breakdown calculation provided and correct?$				
17	Note Thermal Mass Parameter (TMP) is the sum of (individual area x individual heat capacity) for	[35]			
	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.	[55]			
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					
	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?	Input			
	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	sheets	_		
	6.3 to 6.6, and Domestic Building Services Compliance Guide for further guidance).				
	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,	Input			
	flow switch, interlock, bypass, energy manager, time and temperature zone controls, weather	sheets	_		
	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				
20	 <i>perform the boiler interlock function (a separate room thermostat is required in one room).</i> Under data input for Secondary Heating, is the secondary heating detailed and 				
20		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	Input sheets			
	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.			_	
	men a premier of a new pamp, see guidance in Appendix At in SAT 2007.				

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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.			
	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 <u>www.boilers.org.uk</u>). 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). 			
	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?			
		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)?		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 SAP 2009 completion calculation? <i>See Checking EPCs overleaf.</i>				

Notes:

	Checking EPCs			Yes	No	Notes
1	Current EPC format - for SAP EPCs for new dwellings where a building warrant is					
	applied for on or after 9 January 2013:					
	* This process may also be used voluntarily for pre 9 January 2013	* This process may also be used voluntarily for pre 9 January 2013 building warrant applications.				
	Energy Performance Certificate (EPC) $\frac{PREVIEW}{NOT FOR ISSUE}$ S $\stackrel{(L)}{\rightarrow}$ P	a)	The EPC must be produced by a member of			
	1 High Street, Low Town, AA0 0AA		an Approved Organisation			
	Dwelling type: Semi-detached house Reference number: 0000-0000-0000-0000-0000-0000-0000-00		(see list on BSD website).			
	Date of certificate: 17 July 2012 Primary Energy Indicator: 540 kWh/m²/year Total floor area: 147 m² Main heating and fuel: Boiler and factors, dual fuel (mineral and wood)	b)	Check validity of EPC on			
	You can use this document to: • Compare current ratings of properties to see which are more energy efficient and environmentally friendly • Find out how to save energy and money and also reduce CO ₂ emissions by improving your home	0)	Scottish EPC register			
	Estimated energy costs of your home for 3 years* £9,468 See your recommendations		using Report Reference			
	Over 3 years you could save* £3,417 report for more reformation * based upon the cost of energy for heating, hot water, lighting and ventilation, calculated using standard assurptions		Number (RRN) (see RRN			
	Very energy efficiency Rating This graph shows the current efficiency of your home.		circled red on EPC)			
	taking into account both energy efficiency and fuel costs. The higher this rating, the lower your fuel bills are linkey to be.	c)	If EPC valid and building			
	G6640 D 78840 E Your current rating is band F (32). The average rating for a home in Scotland is band G (0).		details match subject of			
	gram F 130 G		warrant, verifier accepts			
	Not energy efficert - Nigher running costs Very environmentally frendly - lower Co ₂ emissions Comment Polanital Environmental Impact (CO ₂) Rating		EPC.		<u> </u>	
	(12 plus)	Not	tes:			
	emissions. The higher the rating, the less impact it has on the environment. Your current rating is band F (22). The average rating					
	Image: second					
	It-20 Not environmentally friendly - higher CO ₂ emissions					
	Top actions you can take to save money and make your home more efficient					
	1 Room-in-roof insulation £1,500 - £2,700 £879 Ø					
	2 Cavity wall insulation £500 - £1,500 £1385 ♥ 3 Floor insulation £800 - £1,200 £812 ♥					
	A full list of recommended improvement measures for your home, together with more information on potential cost and savings and advice to help you carry out improvements can be found in your recommendations report.					
	When the Green Deal launches, it may allow you to make your home warmer and cheaper to GRENTER, nn at no up-ford toost. See your DWELLING AND NOT BE REMOVED UNLESS IT IS					
	GREIDS, recommendations report for more details. REPLACED WITH AN UPDATED CERTIFICATE Page 1 of 0					
2	Previous EPC format - for SAP EPCs for new dwellings	who	ro o huilding warrant is			
2	applied for before 9 January 2013 :	wite	re a building warrant is			
		a)	The EPC may be			
	Energy Performance Certificate	<i>u)</i>	produced by any party via			
	Address of dwelling and other details [address] Dwelling type: Semi-detached house		approved SAP software.			
	Name of approved organisation: N/A Membership number: N/A Date of certificate: 22 March 2011	b)	Verifier checks EPC as			
	Reference number: N/A Type of assessment: SAP, new dwelling Total floor area: 62 m ²		part of reasonable inquiry			
	Main type of heating and fuel: Boiler and radiators, mains gas This dwelling's performance ratings		prior to accepting			
	This dwelling has been assessed using the SAP 2009 methodology. Its performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact		completion.			
	based on carbon dioxide (CO ₂) emissions. CO ₂ is a greenhouse gas that contributes to climate change. Energy Efficiency Rating Environmental Impact (CO ₂) Rating	c)	If content that EPC is			
	Current Potential Current Potential Vety energy-efficier - seer column participation Itely environmentally frendy - seer columnities Potential Instrumentally Tendy - seer columnities Itely environmentally frendy - seer columnities Potential		representative of the			
	(#141) B (20) (#141) E (85 (85		completed building,			
			verifier accepts EPC.			
	(#64) E (#34) F (#34) F	Notes:				
	(1-36) (1-30) G Not energy efficient - higher running costs Hait emissionerstally. Manaty - ligher CO, emissions					
	Scotland EU Directive 2002014EC Scotland EU Directive 2002014EC The energy efficiency rating is a measure of the environmental impact rating is a measure of a The environmental impact rating is a measure of a					
	overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower carbon dioxide (CC ₂) emissions. The higher the rating the less impact I has on the environment.					
	Approximate current energy use per square metre of floor area: 110 kWh/m² per year Approximate current CO ₂ emissions: 19 kg/m² per year					
	Cost effective improvements					
	Below is a list of lower cost measures that will raise the energy performance of the dwelling to the potential indicated in the tables above. Not applicable					
	Not applicable A full energy report is appended to this certificate					
	Remember to look for the energy saving recommended logo when buying energy-efficient products. It's a quick and easy way to identify the most energy-efficient products on the market.					
	For advice on how to take action and to find out about offers available to help make your home more nergy efficient, call 0800 512 012 or visit www.energysavingtrust.org.uk					
	N.B. THIS CERTIFICATE MUST BE AFFIXED TO THE DWELLING AND NOT BE REMOVED UNLESS IT IS REPLACED WITH AN UPDATED VERSION Page 1 of 5					
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