

SAP 2012 AND PART L1A 2013

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Introduction

The Part L1A 2013 regulations come into force on 6th April 2014 and will be calculated using SAP 2012 calculations.

This paper explains the technical changes in both SAP 2012 and Part L1A 2013 as compared to SAP 2009 and Part L1A 2010. It also includes references to specific sections of the SAP 2012 document.

The paper is accompanied by a version of the SAP 2012 document marked up with changes, which can be found here:

http://planassessor.co.uk/Downloads/Documents/SAP_2012_October_2013_showing_differences_from_SAP_2009.pdf

The Part L 2013 approved documents and associated Domestic Building Services Compliance Guides are available from the following link:

<http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/changes>

A brief overview of the changes in Part L1A 2013 by Dyfrig Hughes can also be found here:

<http://www.nesltd.co.uk/blog/part-l1a-2013-10-key-points>

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SAP 2012

Calculation changes

- Semi-rigid ducts
 - Semi-rigid ducts for mechanical ventilation systems introduced alongside rigid and flexible ducts. The calculations for semi-rigid ducts are the same as those for rigid ducts (*section 2.6.8 page 13*)
- SAP default heat pump efficiencies and installation factors
 - Default efficiencies are lower (*SAP Table 4a page 142*) and dependant on the system flow temperature. If a heat pump is installed under the Microgeneration Certification Scheme (MCS) the efficiency is increased by an installation factor, ranging from 1.03-1.47 (*section 9.2.7 page 25*)
- Low temperature systems
 - Efficiency adjustments for condensing boilers or heat pumps operating at low temperatures were only available when the emitter was underfloor. These adjustments are now available where the system has been designed to work at low flow temperatures and the emitters correctly sized. (*section 9.3 page 27 and table 4c page 147*)
- Heat pumps from Product Characteristics Database (PCDB)
 - Heat pumps from the PCDB can now be assigned to main system 2 where the heat pump provides hot water only. (*Appendix A page 39*)
 - In SAP 2009 where the plant size ratio (the ratio of the output of the heat pump to the design heat loss) is outside of the range provided in the PCDB, the calculation is invalid. In SAP 2012, for heat pumps other than exhaust air heat pumps, where the PSR is greater than the largest value in the PCDB, the calculation continue, using a linear interpolation of the efficiency between that at the largest PSR and 100%. (*Appendix N page 89.*)
 - Water source heat pumps are now separated into 'ground water' and surface water'. Ground water heat pumps use underground water accessed via a bore hole, surface water heat pumps use lakes or rivers. (*Appendix N page 90*)
 - Solar assisted heat pumps are now in the PCDB. These heat pumps use the solar heated water as the heat source. The solar aspect of these systems is handled through appendix Q. (*Appendix N page 90*)
 - Wet heat pumps in the PCDB are now classified by flow temperature rather than emitter. (*Appendix N page 91*)
- Community biofuel CHP
 - In SAP 2009/Part L 2010 any negative CO2 emissions were not included in the DER. These negative CO2 emissions can now be included IF the "*fabric insulation of the dwelling conforms with the current requirements of building regulations*". At the time of writing there is no information on how this will be defined, but we expect this to mean meeting the Target Fabric Energy Efficiency rate (TFEE). (*Appendix C page 49*)

- Waste water heat recovery systems (WWHRS)
 - These are now separated into two types of system, instantaneous and storage with different calculations. The storage WWHRS include a dedicated hot water storage volume and can be fitted to baths as well as showers. However, storage WWHRS cannot be used in conjunction with solar water heating. *(Appendix G page 68)*
- Solar hot water
 - The calculation now includes a second order heat loss coefficient for the collector, this is used in calculating the collector performance ratio.
 - There is an adjustment for the hot water use within the calculation, increasing the assumed hot water usage where there are non-electric showers or baths only and reducing the assumed hot water usage where there are only electric showers present. *(appendix H page 74)*
- PV on blocks of flats
 - If the PV output goes to individual flats, then that benefit, both CO₂ and costs are credited to each flat
 - If the PV output goes to the landlord supply or anything other than to the individual flats, only the CO₂ is credited to each flat in proportion to the floor area. There is no credit to the costs or SAP rating
- Solar radiation
 - The algorithms to calculate the solar radiation (used for PV/solar thermal and solar gains) have been updated to allow orientations other than the standard 8 compass points. *(Appendix U page 114)*
- Storage combi losses
 - The losses associated with the storage element of a storage combi have increased. *(Table 2b page 137)*
- Primary circuit losses
 - The algorithm for calculating primary circuit losses has been updated and now includes an element for whether the water is timed separately.
 - There are now options for partial insulation of the primary pipework *(Table 3 page 138)*
- Electric CPSU
 - The responsiveness for the electric CPSU has gone up from 0.75 to 1.0. *(Table 4a page 141)*
- Mechanical ventilation in-use factors
 - There are now in-use factors for mechanical ventilation systems installed under the Approved Installation Scheme. *(Table 4h page 153)*
- Fuel prices, emission factors and primary energy factors
 - These have all been updated and there is a standing charge for standard tariff electricity for use with unregulated energy uses, such as the occupancy assessment. *(Table 12 page 164)*

New Products/data items

- High retention storage heater
 - Selected from the Product Characteristics Database. These storage heaters have a much higher responsiveness than standard storage heaters, they are also able to estimate the next days' heat demand based on the external temperatures. This leads to a reduction in the heating energy requirement. (*see section 9.2.8 page 25*)
- Programmable TRV & communicating TRV
 - Both selected from the Products Characteristics Database (PCDB). They can only be selected when the selected boiler is suitable (this information is held in the PCDB). Programmable TRVs are considered 'time and temperature' control and affects the zone 2 (non-living area) temperature calculations. They do not provide a boiler interlock. Communicating TRVs are also considered 'time and temperature' control and can provide boiler interlock (*section 9.4.7/8 page 28, section 9.4.14 page 29, table 4e page 149 and table 9 page 158*)
- 18 hour tariff
 - New electricity tariff for use with electric CPSU (*section 12.4.3 page 32*)
- Thermal bridging junctions
 - There are 19 new junctions included, including a new section for junctions within a roof or roof room. (*Appendix K page 79*). The only y-value that can now be specified is $y = 0.15$.
- Hot water only heat pump
 - There is now a SAP default hot water only heat pump. (*Table 4a page 145*)
- Central heating pump
 - Central heating pumps installed in 2013 or later have less electricity and gains associated with them. (*Table 4f page 152 and Table 5a page 154*)

Product characteristics database (PCDB)

The following can now be selected from the PCDB:

- Enhanced load compensator
 - These were previously selectable outside of the PCDB, in SAP 2012 these are selectable from the PCDB only
- Weather compensator
 - These were previously selectable outside of the PCDB, in SAP 2012 these are selectable from the PCDB only
- Warm air heating systems
- Specific community heating schemes

Definition clarifications

- Wall between a heated stairwell or corridor is treated as a party wall (*section 3.3.2 page 15*)
- Party wall effective sealing means top, bottom and vertically (*table 3.6 page 19*)
- Semi glazed door defined as 30%-60% glazed and no solar gains are associated with semi glazed doors. Glazed doors are >60% glazed and are treated as windows with the associated solar gains. (*table 6.1 page 22*)
- Time and temperature zone control definition. There are 8 conditions that must be met for controls to be considered to have time and temperature zone control. (*section 9.4.14 page 29*)
- The calculation assumptions regarding heat pumps from the PCDB are clarified. If a heat pump providing DHW has no synchronised control, then the DHW efficiency will be recorded in the PCDB as 100%. If a heat pump has an auxiliary heater and this is not synchronised with the heat pump, the fuel costs calculated are likely to be underestimated. (*Appendix N page 89*)

Weather data

- The weather data for the degree day regions has been updated and now takes in to account the height above sea level for each region.
- In addition the PCDB now holds weather data for each post code district. i.e. the MK5 part of MK5 8NA
 - External temperatures (*table U1 page 111*)
 - Wind speed (*table U2 page 112*)
 - Solar radiation (*table U3 page 113*)
- The SAP rating, DER, TER, DFEE and TFEE all use 'UK average' weather data. In SAP 2009 this was the weather data for the East Pennines region
- The summer overheating calculations (Appendix P) uses the degree day region data from tables U1-U3
- The EPC uses postcode specific weather data from the PCDB

Building Regulations Part L1A

Page numbers refer to the Approved L1A document unless stated otherwise

Regions

- Part L 2013 covers England only. Wales will have their own Building regulations, expected later in 2014. Scotland is expected to update their regulations in 2015.

Target Emissions Rate

- The specification for the notional dwelling for the TER has been updated and also includes the reference psi values for the thermal bridging calculations in the TER (*SAP 2012 Appendix R page 106*)
- The formula to calculate the TER does not use 'emissions factor adjustments'. It is simply the emissions from the notional dwelling with the space and water heating emissions incorporating the relevant fuel factor (*2.4 page 6*)
- Fuel factors have been updated (*Table 1 page 6*). Most of the fuel factors are the same, noticeably electricity has gone up by 5%

Fuel	2010 Fuel factor	2013 Fuel factor
Mains gas	1.00	1.00
LPG	1.10	1.06
Oil	1.17	1.17
B30K	1.00	1.00
Grid electricity for direct acting and storage heaters	1.47	1.55
Grid electricity for heat pumps	1.47	1.55
Solid mineral fuel	1.28	1.35
Any fuel with a CO ₂ emissions factor less than that of mains gas	1.00	1.00
Solid multi-fuel	1.00	1.00

Target Fabric Efficiency (TFEE)

- The introduction of the Target Fabric Energy Efficiency (TFEE) in to Criterion 1; and therefore mandatory. The TFEE rate is a measure of the energy efficiency of the fabric of the dwelling. This is calculated using UK average weather data and according to the specification in *SAP 2012 section 11 page 30*.
- The calculation includes cooling and is the FEE of the notional dwelling plus 15%. This is compared to the Dwelling Fabric Energy Efficiency (DFEE) and similar to the DER/TER comparison the DFEE must equal or better the TFEE. (*2.2 page 5*)
- Block averaging is allowable for the DFEE/TFEE comparison (*2.17 page 11*)

Limiting values

- The limiting fabric parameters have not changed from 2010. However, there is the addition of a limiting U-value for swimming pool basins of 0.25W/m²K (*table 2 page 15*)
- Minimum efficiencies for building services are set out in the Domestic Building Services Compliance Guide and have not changed from 2010 (*DBSCG2013 pages 10-13*)

Demonstrating compliance

- Appendix C describes the process of reporting evidence of compliance and makes it clear that a report output from SAP 2012 software should be available at design and as-built stage
- The list of items whose specification is better than typically expected values that should be highlighted on the report has been updated:

Parameter	2010	2013
Wall U-value	0.20 W/m ² K	0.15 W/m ² K
Roof U-value	0.13 W/m ² K	0.13 W/m ² K
Floor U-value	0.20 W/m ² K	0.13 W/m ² K
Window/door U-value	1.50 W/m ² K	1.20 W/m ² K
Party wall U-value	0.20 W/m ² K	0.20 W/m ² K
Thermal bridging value	0.04 W/m ² K	0.04 W/m ² K
Design air permeability	5.0m ³ /(h.m ²)@50 Pa	4.0m ³ /(h.m ²)@50 Pa
Any secondary heating appliance		
Any item involving SAP appendix Q		
User of any low carbon or renewable energy technology		