SAP 10 Technical Paper

S10TP-04

CHANGE TO APPENDIX H TO INCLUDE SOLAR SPACE HEATING

Issue 1.2

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DOCUMENT REVISION LOG

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1. INTRODUCTION

Previous versions of the Standard Assessment Procedure (SAP) recognised solar water heating via a method published within Appendix H of the SAP specification.

In the SAP 2016 consultation[1], a request was received to broaden the scope of Appendix H to allow for solar thermal systems that contribute towards the space heating service. This note summarises the SAP specification changes that were made to recognise such systems and the technical resources used to inform them.

2. SCOPE

To recognise solar space heating systems within SAP 10.2, BS EN 15316-4-3:2017[2] was used as the basis for updating Appendix H and associated calculations. As the Appendix now allows space and water heating, it has been renamed to “Solar thermal systems”.

The method itself is not reproduced in this technical note – it is fully described in the Standard; however, there are a number of UK specific assumptions we have made which are described below.

In implementing the Standard in SAP 10.2, some changes have been made to existing methods and assumptions in previous SAP versions. The Standard includes several calculation methods, with Method 2 chosen for consistency with SAP. It also requires data inputs that would be accessible to assessors. As far as possible, the inputs required have been kept the same as previous SAP versions, although some new data inputs are

[1] www.gov.uk/government/consultations/public-consultation-on-proposals-to-amend-the-standard-assessment-procedure-sap

[2] BSI (2017) *BS EN 15316-4-3:2017 Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Heat generation systems, thermal solar and photovoltaic systems, Module M3-8-3, M8-8-3, M11-8-3*

required. The following is a list of differences between the Standard and the SAP 10 implementation:

- The existing SAP method (Appendix U) for calculating the monthly average solar irradiance and temperatures has been retained, since it allows for UK specific conditions.
- Values relating to the storage vessel (its volume, combined or separate cylinder and cylinder heat loss) will be input and calculated using existing SAP methods. This will ensure consistency within SAP. Such data is also more likely to be available and understood by assessors.
- The Standard requires a mixed (desired) hot water temperature (θ_w). For the purposes of SAP 1.20 implementation, a water temperature of 41°C is used (which is the temperature assumed for showers within Appendix J of SAP 10.2). This is not the temperature to which the hot water is heated.
- Pump heat gains are calculated using the existing UK method from BS EN 15316-4-3:2017
- The space heating emitter return temperature is calculated based on the flow temperature input by the assessor. It uses a temperature difference derived in SAP 2016 Consultation Paper: “CONSP:02 - SAP heating efficiency calculation for condensing boilers”.

3. IMPACT OF CHANGE

The example scenarios shown in the graph below plot the contribution of the solar thermal system to the space and water heating requirement of three example dwellings, calculated using SAP 2012 and SAP 10.2. The dwelling types used were:

- a well-insulated (new build standards) 50m² dwelling
- a 104m² dwelling with insulation levels typical of the existing housing stock
- a poorly insulated 200m² dwelling

These provide a wide range of hot water and space heating demand. They were analysed with 4 sizes of solar panels (2, 4, 6 and 8m², with a proportionately increasing solar store volume).

The results show that for solar thermal systems providing water heating only (where SAP 2012 and SAP 10 can be compared directly), SAP 2012 predicts greater benefits. The difference is greatest for the smallest and largest panel sizes (up to 24% lower), suggesting the newer method is more sensitive to the system size. However, the reduction in predicted output with a more typical 4m² panel is much less, between 4 and 6% across the three dwelling types.

For solar thermal systems providing space *and* water heating the combined output (space and water heating) is greater for all panel sizes except the smallest. The difference is greatest for the largest panel sizes and in the dwellings with the largest heating demand. This is the expected result since greater heat demand should increase utilisation of any solar energy available.