ADVANTAGES OF USING ADVANCED DETAILS TO CALCULATE PSI-VALUES FOR SAP CALCULATIONS

INTRODUCTION

SAP accounts for thermal bridging by taking the psi-value for each junction and multiply by its length. This gives the heat loss thorough each junction. These results are summed and added to the heat loss parameter. The severity of thermal bridging in a building is often expressed in terms of the Y-value, which is the rate of heat loss, divided by the area of the envelope. When carrying out SAP calculations the assessor must either

1. Use the default y-value of 0.15 W/m2K.[1]
2. Use Accredited Construction Details listed on the Planning Portal
3. Use psi-values calculated by qualified professionals

The first two options make punitive assumptions about the amount of heat loss. Advanced Details falls into the third category, and offers details with psi values specific to the junction under consideration.

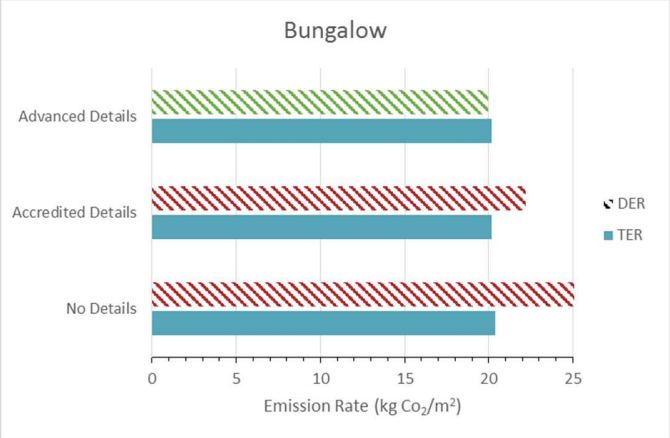
METHODOLOGY

Three typical dwellings were assessed for compliance with AD L1a using SAP 2012. This meant that a range of junctions were included, such as normal and inverted corners, jambs, sills, lintels, party walls, eaves, gables and wall to floor junctions. This ensured a broad comparison of the different types of junctions in the designs. Thermal bridging was accounted for with each of the three methods, for each of the three buildings. Table 1 lists the psi-values used in the analysis. The Advanced Details psi-values were calculated in accordance with BR497 and other relevant standards.

	Notional ψ-Value (W/mK)	Accredited Details ψ-Value (W/mK)	Advanced Details ψ-Value (W/mK)
Normal Corner	0.18	0.09	0.037
Inverted Corner	0	-0.09	-0.065
Jamb	0.1	0.05	0.0288
Sill	0.08	0.04	0.0092
Lintel	1	0.3	0.0317
Party Wall	0.12	0.06	0.051
Eaves	0.12	0.06	0.029
Gable	0.048	0.024	-0.114
Suspended Floor	0.32	0.16	0.083

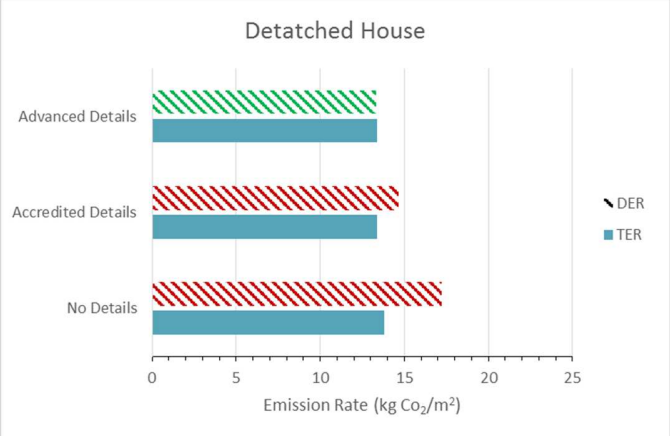
RESULTS

All three buildings analysed would fail according to *SAP 2012* when using default or accredited details. The following graphs illustrate the results.



This shows a significant improvement when using *Advanced Details* instead of default values or accredited details.

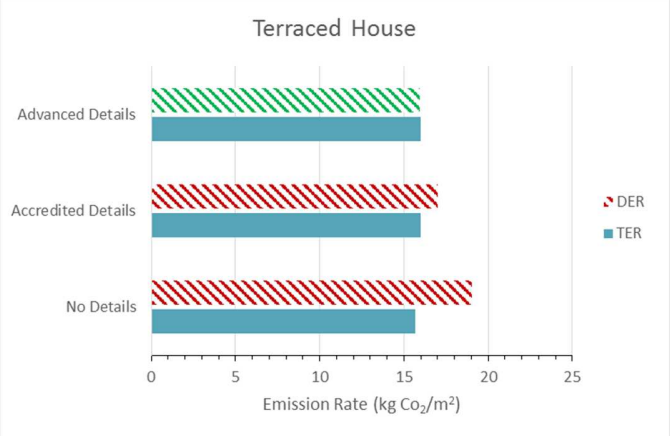
Another way of expressing the results is in terms of the amount of photovoltaic (PV) which would be required on the dwelling in order to attain a pass in SAP. For the case of no thermal bridging details, approximately 1.1 kWp of PV would be required to bring the DER level with the TER for the bungalow, at a typical cost of £2000.



Similarly, in the case of using accredited details, there is a requirement for approximately 0.42 kWp of PV, although this is not generally economically viable to install.

CONCLUSIONS

Use of Advanced Details provides an advantage when designing a dwelling to pass SAP. A reduction of around 10% in the DER can be achieved compared to accredited details, or up to 25% improvement compared to the default values.



This can save money for end-users, designers, assessors and contractors by reducing energy consumption, the time taken to find a solution which achieves a pass in SAP, as well as avoiding costly alternatives such as solar PV. Based on the typical buildings analysed, savings of over £2000 can be made when using *Advanced Details* to model thermal bridging instead of the equivalent offset in solar PV.