Technical note 2014/03 Summary of recent changes to JPA Designer

JPA|TL

1   Introduction

Since the introduction of JPA Designer version 6.01a1 in July 2014 development work on the program has continued, with changes to the SAP and U-value modules. This technical note describes the main changes which affect the user interface.

2   U-value module

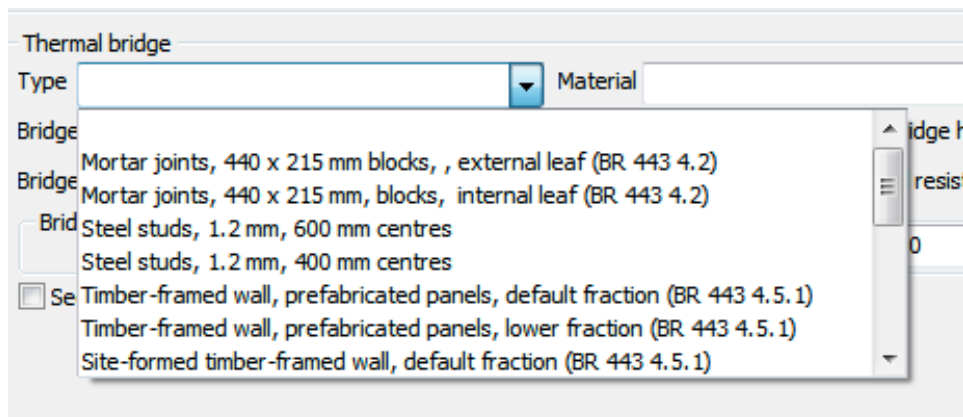## 2.1   Thermal bridging of layers

Figure 1: Adding details of thermal bridging using the new *Type* list

There are now additional methods of entering the details of thermal bridging for layers. Prior to build 014, setting the thermal bridging for a layer always required thee bridge width and non-bridge width, even if the proportion was later adjusted to match default values in BR 443 *Conventions for U-value calculations*. There are now new methods for setting thermal bridging which allow the bridging fraction to be entered directly, without the need to enter any dimensions. Thermal bridging can now be defined by:

- Using one of the built-in defaults to set the bridging fraction and material;

- Setting the bridging fraction and bridging material directly;

- Entering the bridging dimensions and material.

The new methods of specifying bridging will speed up the calculation process.

2.1.1 Using bridging defaults

The new **Type** box (see Figure 1) contains a list of common bridge configurations mainly based on the default fractions and materials specified in BR 443. The default configurations are show in Table 1.

Selecting an item from the list sets:

- The bridge material;

- The thermal conductivity of the bridge;

- The fractional area of the bridge (referred to in JPA Designer as the *Proportion bridged*).

Provided you have specified the thickness of the layer itself, the the thermal bridging data will be complete.

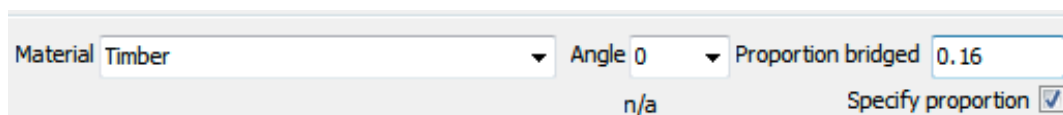### 2.1.2 Setting the bridging proportion directly

Figure 2: Setting the bridging proportion directly

The second method of entering thermal bridging is to specify the bridging fraction directly (Figure 2). To do this:

1. Select the bridging **Material** (which sets the thermal conductivity of the bridge).

2. Tick the box **Specify proportion**.

3. Enter the **Proportion bridged**.

Table 1: Default bridging fractions

Construction	Material	Conductivity	Fraction
Mortar joints, 440 x 215 mm blocks, , external leaf (BR 443 4.2)	Mortar	0.94	0.067
Mortar joints, 440 x 215 mm, blocks, internal leaf (BR 443 4.2)	Mortar	0.88	0.067
Steel studs, 1.2 mm, 600 mm centres	Steel	50	0.002
Steel studs, 1.2 mm, 400 mm centres	Steel	50	0.003
Timber-framed wall, prefabricated panels, default fraction (BR 443 4.5.1)	Prefab panels	0.12	0.150
Timber-framed wall, prefabricated panels, lower fraction (BR 443 4.5.1)	Prefab panels	0.12	0.125
Site-formed timber-framed wall, default fraction (BR 443 4.5.1)	Softwood	0.13	0.150
Site-formed timber-framed wall, lower fraction (BR 443 4.5.1)	Softwood	0.13	0.125
Ceiling, trussed rafters 35 mm, 600 mm cc + 1% other timbers (BR 443 4.6.1)	Softwood	0.13	0.068
Ceiling, 50 mm joists, 400 mm cc + 1% other timbers (BR 443 4.6.1)	Softwood	0.13	0.135
Ceiling, default: 48 mm, 600 mm cc + 1% other timbers (BR 443 4.6.1)	Softwood	0.13	0.090
Timber floor, default: 38 mm, 400 mm cc + 1% other timbers (BR 443 4.6.2)	Softwood	0.13	0.110
Plasterboard battens, 47 mm, 600 mm cc + rails (BR 443 4.7.2)	Softwood	0.13	0.118
I-beam flanges, 38 mm wide, default fraction (BR 443 4.5.2)	Softwood	0.13	0.150
I-beam flanges, 38 mm wide, lower fraction (BR 443 4.5.2)	Softwood	0.13	0.125
I-beam flanges, 48 mm wide, default fraction (BR 443 4.5.2)	Softwood	0.13	0.170
I-beam flanges, 48 mm wide, lower fraction (BR 443 4.5.2)	Softwood	0.13	0.145
I-beam web, 4 to 8 mm (BR 443 4.5.2)	OSB	0.13	0.040

2.1.3 Entering bridge dimensions

The third method is to enter the **bridge width** and **non-bridge width** (and for two dimensional bridging the **non-bridge height**) and to select the bridge **material**. This is the original method of setting bridging details which is described in the JPA Designer manual.

2.2 Total thickness of elements

	Thickness (mm)
Outside surface resistance	-
Plasterboard (BS5250)	25.0
Insulation	150.0
Decking Plywood	15.0
Airspace behind tiles on tile hung wall (inc. resistance of tiles) (BS5250)	50.0
Inside surface resistance	-
Total thickness	**240.0mm**

U-value = 0.28W/m²K

Figure 3: Section of a U-value report showing the *Total thickness* figure

Reports from the U-value module can now include the total thickness of the construction at the bottom of the *Thickness* column (Figure 3). The total thickness figure is simply the sum of the thicknesses of individual layers. To get an accurate result you will have to specify the thicknesses of cavities, this is particularly important when adding *cavities more than 25 mm wide* from the product database.

The total thickness option is turned on or off using a tick box on the **Other** tab of the **Options** dialogue.

3 SAP module

3.1 Plate heat exchangers in community heating schemes

The temperature factor used in determining the losses from hot water cylinders and other systems with water storage. For most systems this figure is set automatically, but where a community heating system provides domestic hot water there are two possible values: 0.6 for systems with a hot water cylinder in the dwelling and 1.0 for plate heat exchangers.

In order to allow for this, there is now a new tick box in the Community heating options for domestic hot water: **Plate heat exchanger in Community Heating** (Figure 4). Ticking this box sets the temperature factor to 1.0. Leaving it unticked leaves the temperature factor at 0.6.
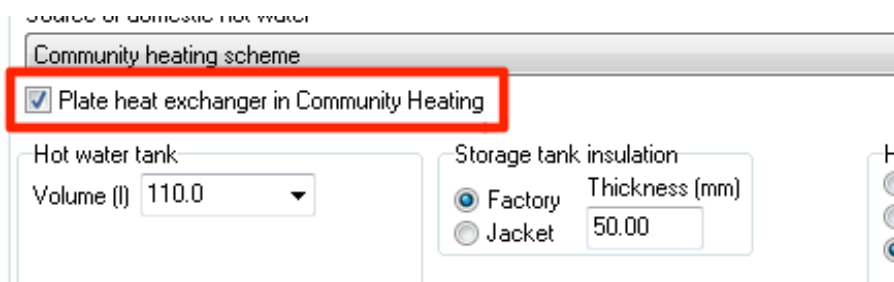
Figure 4: The new plate heat exchanger tick box

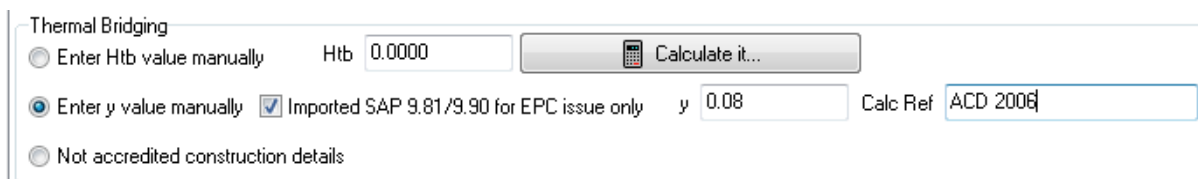## 3.2 Treatment of heat loss at junctions

Figure 5: Revised thermal bridging options

For new dwellings under Approved Document L1A 2013 there are only two acceptable methods of calculating heat loss at junctions:

- Using measured junction lengths and appropriate psi-values.

- Using a y-value of 0.15 in conjunction with the total area of exposed elements.

The use of user-defined y-values is no longer permitted: this limitation is set out in AD L1A 2013 paragraph 3.10 for England, and AD L1A 2014 paragraph 6.3.3 for Wales. The only time a SAP 2012 calculation can have a user-specified y-value (other than 0.15) is if it is a SAP 9.81 or 9.90 calculation which has been converted to SAP 2012 in order to lodge an EPC.

The *thermal bridging* inputs on the **Walls, roofs and floors tab** have been modified to address these limitations (Figure 5). The options now are:

- **Enter Htb value manually**. This option should be used for any calculation where there are psi-values and measured junction lengths. It is appropriate for calculations under Part L 2012, 2010 and 2006. The TER and TFEE calculations will also be be based on psi-values and the same junction lengths.

- **Enter y-value manually**. This option is only valid for calculations under Part L 2006 and 2010. **It is not valid for Part L 2013**. To use this option for a dwelling under those earlier regulations you must tick **Imported SAP 9.81/9.90 for EPC issue only**. Once you have done that the data entry fields for the y-value and calculation reference will be displayed.

When you select this option the program will display neither the TER worksheet, nor the compliance checklist. This is to prevent assessors using this option for Part L 2013 compliance by mistake. (Neither of those reports are required for lodging an EPC for a dwelling complying with earlier regulations.)

- **Not accredited construction details**. This option is valid for all calculations where junction lengths have not been measured. The TER is based on a y-value of 0.05, which is roughly the same as applying the Energy Savings Trust Enhanced Construction Details.
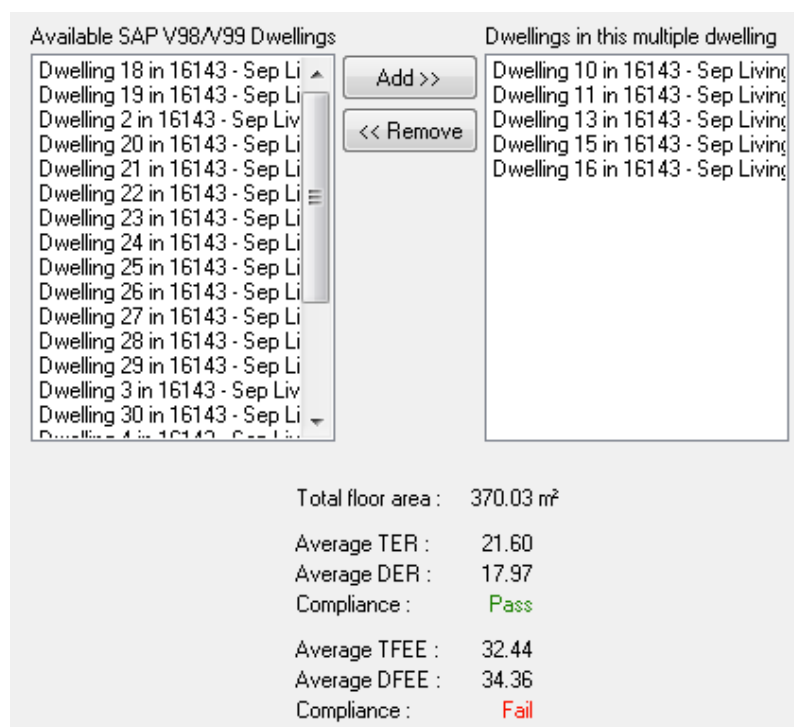
3.3   Multiple dwellings calculations

Figure 6: The 2012 multiple dwellings calculation

The use of average TER/DER and TFEE/DFEE calculations to demonstrate compliance for blocks of flats or terraces of houses is permitted under AD L1A 2013. JPA Designer now includes multiple dwellings calculations for SAP 2012 (Figure 6), which gives the average TFEE and DFEE, as well as the average TER and DER/

To insert a multiple dwellings calculation: on the **Insert** menu select **Dwelling/SAP (V9.92 2012) calculation** and **Building containing multiple dwellings**.

Once the calculation is open use the **Add** and **Remove** buttons to manage the dwellings included in the multiple dwellings calculation by moving them between the left hand and right hand lists. Dwellings in the right hand list *are* included in the calculation: those in the left hand list *are not* included in the calculation.

The calculation shows the area-weighted average values for the dwellings, together with an overall pass/fail status.
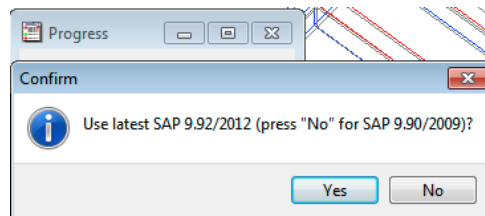
4   VE Import

Figure 7: Selecting SAP 9.92 (2012) or SAP 9.90 (2009) on import

With JPA Designer version 6.01a1 build 017 the import facility from IES VE has been modified to give a choice of import format. Users can now import the VE data to:

- SAP 2012 (V9.92): suitable for Part L 2013 England and part L 2014 Wales. Click **Yes** at the **Confirm** dialogue (Figure 7).

- SAP 2009 (V9.90): suitable for current building standards and regulations in Scotland and Northern Ireland. Click **No** at the **Confirm** dialogue (Figure 7).

The import procedure now brings in party wall, party floor and party ceiling elements from the VE model.

5   Further information

Information about JPA Designer may be found at http://www.techlit.co.uk.

Technical support by email only to support@techlit.co.uk.

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