

THERMAL BRIDGING

A GUIDE TO USE OF ψ -VALUES IN MERRONBROOK TIMBER FRAMED UNITS

INTRODUCTION

In accordance with **Building Regulations Approved Document Part L 2013**, (applicable from April 2014) the **Standard Assessment Procedure (SAP)** for new homes in England & Wales currently requires the thermal envelope to be modelled and evaluated for overall quality by a registered **On-Construction Domestic Energy Assessor**. That process involves simplifying the designed structure into distinct categories, based on the way energy is lost from the structure. These can be best summarised as follows:



Thermal Perimeter Losses

- These are the elements measurable as areas, where the flat plane area of the element is multiplied by the **U-Value**, to arrive at a total amount of energy lost through the flat-panel items such as walls, floors, roofs, windows etc.
- Your Energy Assessor will produce a U-Value calculation for each of the building's elements, and obviously we can assist in provision of data for the wall elements.



Party Wall Losses

- These are the same as the Thermal Perimeter losses, but are a special case, where the U-value is not measured by assessment of the build-up of the fabric, but rather summarised from one of 3 build-type categories.
- If a party-wall is present we can offer to **insulate the cavity** in a way that gives this loss perimeter 'Zero Value'. You should confirm with your Assessor whether you have ordered this service from us.



Thermal Bridging Losses

- These are the losses that occur through the junctions in the structure. They are measured as linear items, such as vertical corners and horizontal wall-to-floor junction lines. The quality of the junction is assigned a **ψ -Value**, which is applied as a multiple of the length of the measured item.
- Your Energy Assessor should use the appropriate ψ -Values from the lists overleaf, according to your chosen method of construction, but all the Merronbrook Special Details apply to our structures in all cases. Your Assessor will require you to fill-in a checklist to confirm compliance with either the ACD or MSD approach.

APPLIED ψ -VALUES

When your appointed **Energy Assessor** is producing **SAP Calculations** for your project, we will liaise with them at all times to establish the correct thermal values to apply, where it's appropriate for us to make comment.

With specific regard to the **Thermal Bridging calculations**, this is increasingly becoming an area of intense scrutiny, as energy performance requirements become more and more challenging.

Merronbrook are proud to provide support and assistance to clients looking to achieve the very best in fabric efficiency, and as part of that commitment we have commissioned a set of tests that allow you to show a high level of performance, and limit the impact of other energy-saving measures (that might have been required if 'default' values were applied).

The process for assessing Thermal Bridging in SAPs, calls for a linear measurement of any given element to be taken, and for a **ψ -Value** to be applied in each case, based on the construction method used.

This can be one of three methods, and can be chosen on a junction-by-junction basis:

1. **No known approach taken**, or no post-construction checklists provided by the developer at final assessment stage. In this case a list of 'default' values are applied.
2. **"Accredited Construction Details"** applied. This is where the developer can demonstrate compliance with a set of details provided by government ¹. These values are generally twice as good as default values, and worth making the effort to apply where possible.
3. **"Merronbrook Special Details"** applied. These are the 'standard practice' details that apply to all our structures, and are applied by us at no extra charge. However, they do not apply to details over which we have no actual involvement, so in these elements you should choose one of the above approaches.²

¹ As-Built Checklists for Accredited Construction Details for Timber Framed Dwellings, available from: http://www.planningportal.gov.uk/uploads/br/wood_frame_illustrations.pdf

² As-Built Checklists for Merronbrook Special Details will be provided for your project, and should be completed and returned to your DEA as appropriate.

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TABLE OF VALUES THAT APPLY TO TIMBER-FRAMED DWELLINGS

DETAIL	DEFAULT ψ -VALUE	ACCREDITED CONSTRUCTION DETAIL ³		MERRONBROOK SPECIAL DETAILS THAT APPLY (ψ) ⁴		COMMENTS
		REFERENCE	ψ	With PIR ⁵	With Phenolic ⁶	
E2 OTHER LINTEL TYPES	1.000	TFW-WD-01	0.300	0.203	0.206	Timber closer acceptable
E3 CILL	0.080	TFW-WD-02	0.040			Timber closer acceptable
E4 JAMB	0.100	TFW-WD-03	0.050			ACD only applies where a proprietary closer is used
E5 GROUND FLOOR TO EXT. WALL JUNCTION	0.320	TFW-GF-02	0.160			
E6 INT. FLOOR TO EXT. WALL JUNCTION	0.140	TFW-IF-01	0.070			Requires only mineral wool behind Rim Board (by others)
INT. WALL TO EXT. WALL JUNCTION		TFW-IW-03				Unmeasured
E10 EAVES (INSULATED AT CEILING)	0.120	TFW-RE-01	0.060			
E11 EAVES (INSULATED AT RAFTER)	0.080	TFW-RE-06/07	0.040			
E12 GABLE (INSULATED AT CEILING)	0.480	TFW-RG-01	0.240	0.102	0.103	
E13 GABLE (INSULATED AT RAFTER)	0.080	TFW-RG-03	0.040			
E14 FLAT ROOF	0.080	TFW-RF-01	0.040			

³ This value can only be applied if the ACD Checklist is completed and returned to the DEA.

⁴ This value can only be applied if the MSD Checklist is completed and returned to the DEA.

⁵ This value can only be applied if Merronbrook are contracted to provide Factory-Fitted PIR Insulation ($\lambda=0.022$) **or** if a product of the same value is fitted by others on site.

⁶ This value can only be applied if Merronbrook are contracted to provide Factory-Fitted Phenolic Insulation ($\lambda=0.020$) **or** if a product of the same value is fitted by others on site. These values are slightly worse than those from PIR, due to heat-sinking at the floor, as a result of an improved wall U-Value, but still better than either 'default' or ACD values.

E15 FLAT ROOF WITH PARAPET	0.560	TFW-RF-01	0.280			
E16 CORNER (EXT. WALL-TO-WALL) normal	0.180	TFW-EW-01	0.090	0.077	0.079	
E17 CORNER (EXT. WALL-TO-WALL) inverted	0.000	TFW-EW-01	-0.090	-0.018	-0.013	
E18 EXT. WALL TO PARTY-WALL JUNCTION	0.120	TFW-IW-01	0.060			Applies to BOTH walls in the junction
				0.040	0.043	Applies as one value per junction
INT. WALL TO ROOF JUNCTION		TFW-IW-04				Unmeasured
P1 GROUND FLOOR TO PARTY WALL JUNCTION	0.160	TFW-GF-02	0.080			
P2 INT. FLOOR TO PARTY WALL JUNCTION	0.040	TFW-IF-01	0.000			
P4 ROOF EDGE (INSULATED AT CEILING)	0.240	TFW-IW-02	0.120			
P5 ROOF EDGE (INSULATED AT RAFTER)	0.040	TFW-IW-02	0.020			

IF YOU ANY QUERIES ABOUT HOW TO APPLY ANY OF THE INFORMATION CONTAINED HERE, PLEASE CALL OUR DESIGN TEAM AT OUR OFFICES

01252 844747

OR EMAIL THE TIMBER FRAME OPERATIONS MANAGER, ANDY GIBSON

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