

# THERMAL PERIMETERS

A GUIDE TO *U-VALUES* PROVIDED BY 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  $\psi$ -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.

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### ASSESSED U-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 **Wall U-Values**, 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 we currently offer a service to factory-fit insulation into our open-panel frames.

We are also continuously looking at improving the type and range of services we offer in this

regard. At this time, we offer a 'standard' insulated panel, insulated with 100mm rigid closed-cell phenolic foam insulation, which acts as a robust core of a modern domestic wall.

Our advice is to use this as the insulated structural base panel, and add further insulants to the inside face as required to achieve the required U-Value.

We have had our standard panel assessed by AES Southern, to qualify the U-Value offered, but in all cases this would need to be agreed by your own appointed assessor.

If you do not have an appointed assessor, we're more than happy to have this service provided for you by a third party, fees available on request.

### EXAMPLES OF U-VALUES ACHEIVABLE<sup>1</sup>

Standard panel <sup>2</sup>	0.18
Add 30mm Thermaline Basic instead of dry-lining	0.17
Add 30mm Thermaline Super instead of dry-lining	0.16
Add 48mm Thermaline Super instead of dry-lining	0.15
Add 25mm PIR insulation before dry-lining	0.15

<sup>1</sup> For illustration only – U-Values must always be re-assessed by your appointed Energy Assessor.

<sup>2</sup> All based on standard 140mm external panel factory-fitted with 100mm Phenolic, 40mm resistive service void inside, 15mm dry-lining to room face.

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### SUMMARY CALCULATION FOR OUR 'STANDARD' WALL PANEL

Layer	d (mm)	layer	bridge	Fraction	Density	Sp. heat	R layer	R bridge	Description
							0.130		Rsi
1	13	0.180			700	1000	0.072		Plasterboard
2									Vapour Control Layer
3	40	R-value	0.120	0.0760	1	1000	0.644	0.333	Reflective insulation skin
4	100	0.020	0.120	0.0760	12	1030	5.000	0.833	Phenolic in panel
frame									
5	10	0.130			500	1600	0.077		OSB Sheathing
6									TF200Thermo Reflective Breather
7	75	R-value			1	1000	0.770		Cavity
8	105	0.770			1700	800	0.136		Brick Outer (BRE)
							0.040		Rse
<b>totals</b>	<b>343</b>						<b>6.870</b>		

ROUNDED CORRECTED U-VALUE: **0.18 W/M<sup>2</sup>K**

### SUMMARY CALCULATION FOR OUR 'BUDGET' WALL PANEL

Layer	d (mm)	λ layer	λ bridge	Fraction	Density	Sp. heat	R layer	R bridge	Description
							0.130		Rsi
1	13	0.180			700	1000	0.072		Plasterboard
2									Vapour Control Layer
3	40	R-value	0.120	0.0760	1	1000	0.644	0.333	Reflective insulation skin
4	100	0.022	0.120	0.0760	12	1030	4.545	0.833	PIR in panel
frame									
5	10	0.130			500	1600	0.077		OSB Sheathing
6									TF200Thermo Reflective Breather
7	75	R-value			1	1000	0.770		Cavity
8	105	0.770			1700	800	0.136		Brick Outer (BRE)
							0.040		Rse
<b>totals</b>	<b>343</b>						<b>6.415</b>		

ROUNDED CORRECTED U-VALUE: **0.19 W/M<sup>2</sup>K**

# THERMAL PERIMETER

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### SPECIFICATION OF OUR INSULATION SERVICE

If we are contracted to factory fit insulation into our wall panels, this will be whichever product was chosen as part of the costed package, and will be fitted wherever practical into all wall panels that are appropriate to forming the external wall envelope. This will likely be a rigid closed-cell product (such as polyisocyanurate), cut accurately to fit between studs with minimal gaps, and held in place against the sheathing board with a proprietary clip product. Any remaining void will be left open on the 'room' side of the panel.

#### **Examples of exclusions to factory-fitting are:**

There may be some irregular panels which can't reasonably be pre-manufactured.

Some parts of the 'wall envelope' might not be formed in panels, e.g. where 'walls' are formed as upstands in the roof envelope, from truss-ends.

The junction of any floor zone with the external envelope, or similarly any area of exposed floor such as an overhanging porch or balcony. These are not parts of the 'wall' but are in fact floor edges and are accounted for in Energy Assessments differently to walls.

The above items will NOT be insulated either in the factory or on site. They may also be subject to a different protocol for Energy Assessment. For further information, refer to our document on Thermal Bridging.

Additional insulation can be purchased to insulate these areas in conjunction with the rest of the 'supply-only' insulation package for the project, or entirely separately.

All joints between the rigid insulation and the timbers of the wall panels will be as tight as practically possible within tolerances and the natural variance in the timber sizes. If some joints are found to be greater than reasonably acceptable, we will include to fill these gaps with a suitable expanding foam or sealant, but in general terms we do not include for universal filling, sealing or taping of these interfaces as it is not a requirement of any of the manufacturers at this time. Your Energy Assessor should be made aware of this specification to enable them to assess the U-Value of the panels correctly.

**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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