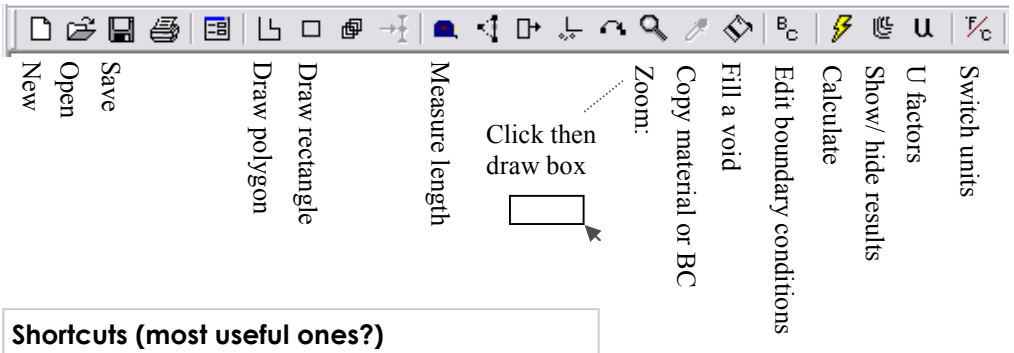
●WARM: Low Energy Building Practice
01752 542 546 - www.peterwarm.co.uk

Using THERM for construction details - quick reference sheet



Shortcuts (most useful ones?)

Calculate :	F9
View extent of model	F7
Show U factors	ctrl F9
Zoom in	right click
Zoom out	shift + right click

Cope and paste components

Draw >> locator - point in source model
Edit >> select all then edit >> copy
Draw >> locator - point in destination model
Edit >> paste

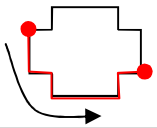
Options>> preferences >> THERM file settings	
Quad tree mesh:	6 (may need 8)
Maximum % error:	10%
Maximum iterations:	10

Order to complete model

1) Paste in previous components if relevant
2) Draw remaining elements
3) Edit / set boundary conditions
4) Calculate
5) Check U factors correct - i.e. total length
6) Run the report from the file menu

Multiple select boundary conditions

Click first BC > Shift double click on last BC (THERM will select all BCs in anticlockwise direct from the first to last)



How to

Display a U value for a single component: View U factor, set total length, U factor = U value
Model an air void: Set the material to 'CEN frame cavity....' un / ventilated as appropriate
Fill a void in the model with material: Draw menu >> Fill void

Visual output options (mostly under calculation > display options)
(refer to 'THERM setup instructions' for setup up values)

- *Colour flux magnitude:* most useful diagnostically, brighter colours indicate high heat flow and therefore likely problem (*large* area of slightly brighter colour can also be a problem)
- *Colour infrared:* colour bands indicate lines on constant temperature
- *Show Polygon outline:* very useful to show the model outline behind the colour results
- *Show legend:* also useful to give scale to above colours
- View menu >> *Show temperature at cursor:* as it says - hover cursor over model for °C

Errors / error reports

Overlapping geometries - redraw the components around the highlighted region ○
Conrad memory - model/ mesh too complicated - change quad tree mesh parameter to 8 or simplifying model - concentrating especially on high conductivity elements

Know something you think might help? Email us and we may add it and credit you
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THERM to PW EXCEL — quick reference sheet

Terms used	
L2D	The total flow though a junction in W/m.K
Psi	The Greek letter Psi (ψ) is the symbol for a thermal bridge (units W/m.k)

Basic thermal bridging concept

A thermal bridge calculation is required as a correction where a simple heat loss calculation is an underestimate. Simple heat loss is calculated from U value x Area.
A correction may be required where:

- there is a change in general insulation levels
- the geometry results in not taking into account the true heat loss

THERM calculates the true heat loss for 2D calculations, this is known as L2D.
We subtract the simple heat losses (U x A) from the L2D to find the correction or Psi value.

External measurements tend to overestimate heat loss. As a consequence it is possible to develop a design that is considered thermal bridge free ***U value x Area >= L2D***
This is not possible with internal measurement (SAP)

FAQ

Does it matter if the spreadsheet is reading 'internal or 'external' ?
Only if your modelling a suspended floor void - in which case only use 'internal' - otherwise your L2D will be missing some of the heat flow which is allocated to 'floor void'

Can I enter the U values for simple heat loss elements rather than THERM calculating them?
Its not a good idea. Using the same elements as you use in your complete (L2D) model will ensure that Psi derivation: [ψxL = L2D - ***U***xA] uses the correct modelling **U** value.

Some basic sense checks

- Do your isotherms show any distortions that can't be explained?
- Is the L2D the same from internal and external U factor surfaces? (except sus. floor)
- Are U values of simple heat loss elements what you expect?
- Is internal Psi value zero or negative? (Ok only for internal corners)
- Is external Psi value highly negative ? (less than -0.2 W/m.K is possible for corrections to badly insulated main structures).

Think there may be a problem?
- Go back to THERM and check all your BCs and U factors surfaces are present and correct
- Check your internal / external measurements
- Check you are using total length (or projected x/y as appropriate)
- Check that all your simple heat loss elements are being subtracted from the L2D

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