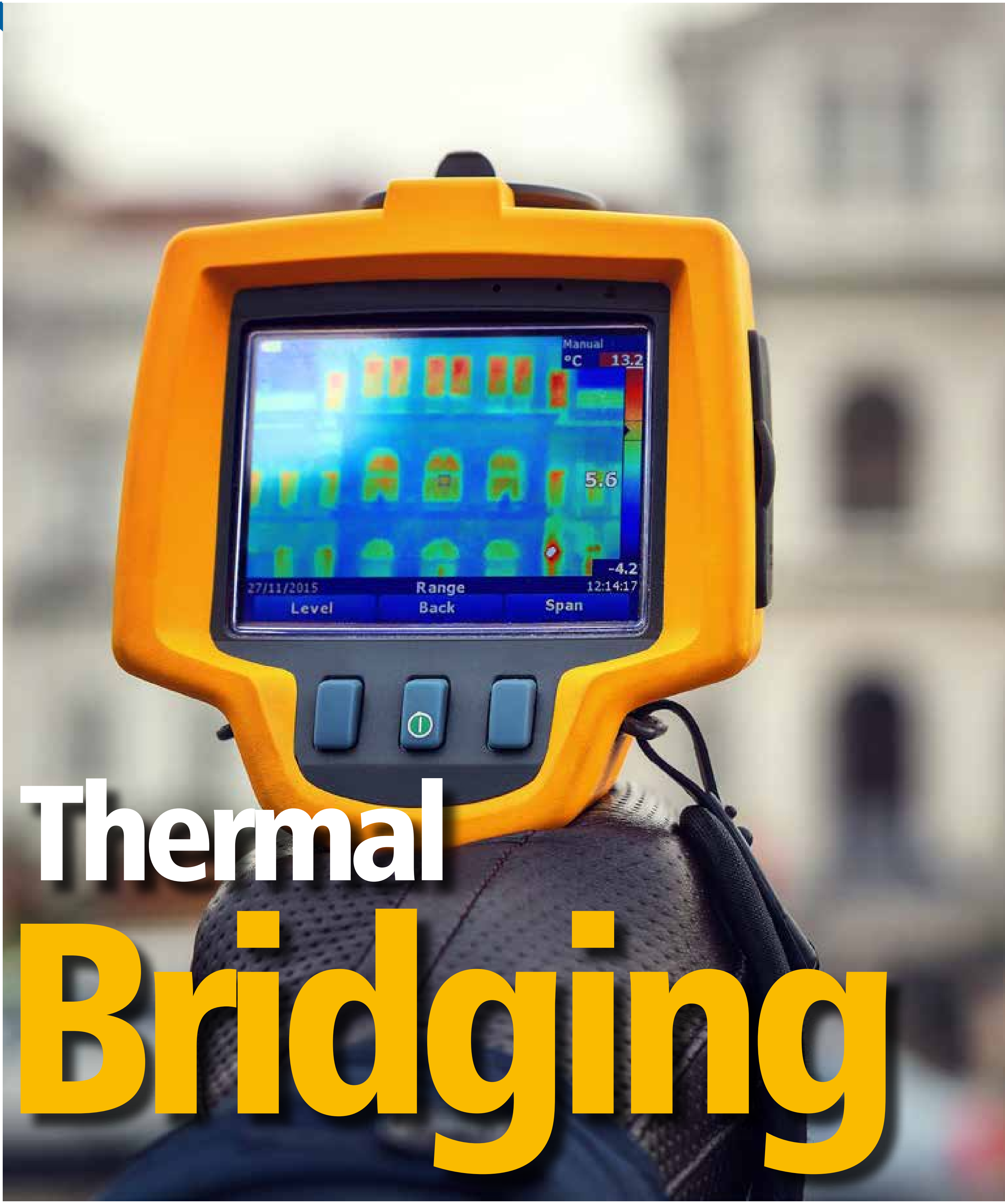


Thermal Bridging

The importance of thermal bridging is due to its influence on the air tightness of the building, energy efficiency and heat loss. Thermal bridging occurs when there are two or more heat conductive elements not connected to each other what creates the discontinuity in the building envelope.

Heat losses occur when the integrity of the insulation envelope of a building is influenced by the more conductive material.Thermal bridging occurs at junctions, for instance when the layer of insulation is interrupted by a more conductive material, often in places like wall and window or wall and floor. At this points, heat is more transferred through the construction, and cold spots occur. Cold spots cause excessive heat loss and can lead to the condensation and mould growth. Improving junctions details to reduce cold bridges will help achieve Building Regulations compliance. The Approved Document of Part L Building Regulations states that 'The building fabric should be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements, at the joints between elements and the edges of elements such as those around window and door openings.'

Particular heat losses occur in old buildings that lack insulation or have single wall construction and single glazing. In such cases retrofitting improves energy efficiency be adding insulation layer, loft insulating or fitting double glazing.

There are two types of the thermal bridging, repeating and non-repeating. Repeating thermal bridges are mortar joints and wall-ties in masonry construction or timber or steel studs in framed construction. It is possible to calculate U-values knowing number and place of repeating thermal bridges. Non-repeating thermal bridges is a wall junction and lintel, accounted with PSI-values and calculated by thermal modelling software. Thermal bridges can be revealed with thermal imaging carers

Heat losses connected with particular construction elements like walls, windows, floors, etc. multiplied by its U-value gives the anticipated heat loss. Thermal bridge losses can be quantified by multiplying the junction PSI-value by the junction length. Total heat loss from all building junctions is expressed by Y-value- the sum of all individual junctions heat losses divided by the total surface area of the dwelling.

For detailed information on Thermal Bridging check Zero Carbon Hub publication "Thermal Bridging Guide" at ***www.zerocarbonhub.org***

Follow approaches presented by the Zero Carbon Hub to reduce thermal bridging.

Masonry construction

Ensure:

1. Use of a split or thermally broken lintel
2. Use light aggregate clockwork inner leaf
3. Use a PU/PIR cavity closer
4. Use insulated plasterboard on the inner leaf
5. Use a window frame overlap of minimum 50mm.
6. Increase eaves insulation depth

Avoid:

1. Omitting rafter insulation at eaves
2. Omitting insulation between truss and wall
3. Omitting soffit insulation at eaves
4. Stopping party wall cavity insulation short of loft
5. Omitting a cavity closure
6. Omitting a cavity insulation below DPC
7. Omitting floor perimeter insulation
8. No window frame overlap with the cavity

Timber frame construction

Ensure:

1. Use thermal laminate plasterboard on the side of frame
2. Use beam and block ground oor instead of ground bearing slab
3. Use light aggregate footing blocks
4. Use min. 50mm or perimeter insulation thickness
5. Use a window frame overlap of min. 50mm
6. Use min. 150mm insulation behind rim board
7. Use a PU/PIR cavity closer
8. Increase eaves insulation depth
9. Use PU/PIR cavity lintel insulation

Avoid:

1. Omitting ground oor perimeter insulation
2. Omitting rafter insulation at eaves
3. Omitting rim board insulation
4. No window frame overlap with cavity
5. Omitting the cavity closure
6. Omitting so t insulation at eaves
7. No cavity lintel insulation

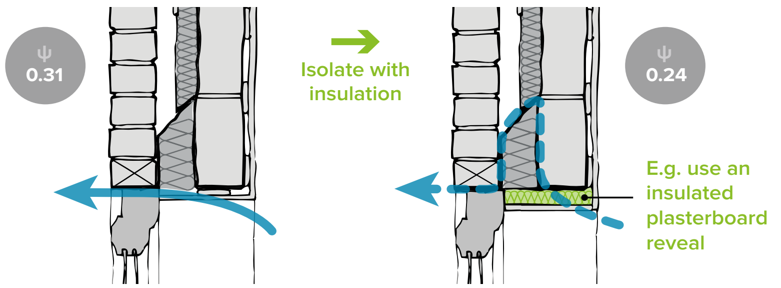
Source: Zero Carbon Hub- Thermal Bridging Guide

HOW DO I IMPROVE JUNCTION PERFORMANCE?

Thermal bridging heat losses occur when the integrity of the insulation envelope of a building is compromised by a more conductive material. The diagrams below illustrate four alternative ways in which the effects of cold-bridges at building junctions can be reduced or negated using a masonry lintel as an example. In the main body of the Guide one or more of these strategies are used to show how each of the most important PSI-values in dwellings can be reduced and by how much

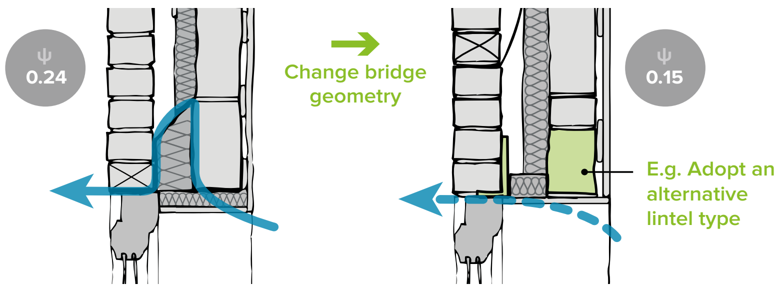
1. ISOLATE THE THERMAL BRIDGE WITH INSULATION

Use a layer of insulation to minimise direct contact of the thermal bridge with either the inside or outside temperature.



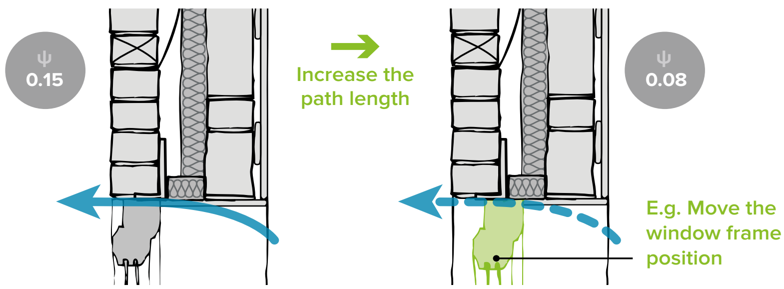
2. CHANGE THE THERMAL BRIDGE GEOMETRY

Move, remove or reduce the size of the thermal bridge component.



3. INCREASE THE THERMAL BRIDGE HEAT PATH

Increase the length of the thermal bridge or strategically place insulation in order to make the heat travel further to escape.



4. CHANGE THE THERMAL BRIDGE MATERIAL

Change the conductivity of the material causing the thermal bridge.