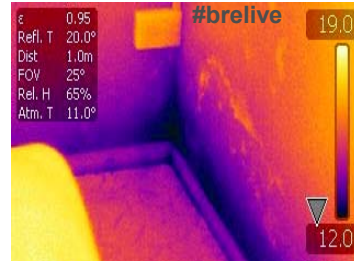


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Unintended Consequences

- 126 Unintended Consequences
- 27 Significant risk to fabric and health
- Many moisture related
- Most avoidable, with proper surveys, changes to industry practice
- 12 Major changes to the way we do business.



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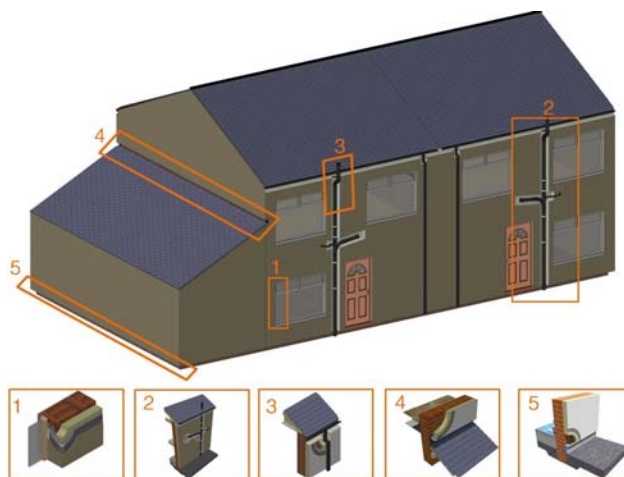
bre An Integrated Approach



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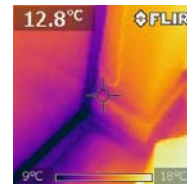
Typical Cold Bridging in EWI



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bre What is a cold (heat) bridge?

- Heat loss through a localised area where the primary insulation layer is interrupted or significantly reduced
- Difficult but not impossible to treat in solid wall insulation
- Become more significant where the building fabric has been upgraded



Effects of a cold bridge

- Rise in heat energy demand
- Indoor surfaces at lower winter temperatures
- Increased risk of surface condensation
- Risk of damages to building units, leading to vacancies & rehousing costs
- Danger of mildew, causing serious health threats, potential litigation

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bre focus on thermal bridging?

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Reducing thermal bridging at junctions when designing and installing solid wall insulation

Caroline Weir, Tim Ward and Colin King



Table 6: Heat loss in example dwelling with external insulation and improved detailing at key junctions

Junction	Length (m)	U-value (W/m ² K)	Total (W/K)
Ground floor/external wall	20.0	0.154	3.08
Internal floor/external wall	20.0	-0.001	-0.02
Eaves	12.0	0.042	0.50
Gable	8.0	0.258	2.06
Head	8.0	0.064	0.51
Sill	8.0	0.110	0.88
Jamb	22.8	0.056	1.28
Corner	10.0	0.112	1.12
Party wall/external wall	10.0	0.329	3.29
Ground floor/party wall	8.0	-0.057	-0.46
Party wall/floor	8.0	0.179	1.43
Total heat loss from junctions			13.68
Fabric element	Area (m ²)	U-value (W/m ² K)	Total (W/K)
Walls	88.6	0.261	23.12
Floor	48.0	0.201	9.65
Roof	48.0	0.268	12.82
Windows	11.4	2.200	25.08
Total heat loss from fabric elements			71.47
Overall heat loss			85.15
Junction loss as % of fabric loss			17.75

Table 7: Heat loss in example dwelling with external insulation and improved detailing at key junctions

Junction	Length (m)	U-value (W/m ² K)	Total (W/K)
Ground floor/external wall	20.0	0.289	5.86
Internal floor/external wall	20.0	-0.002	-0.05
Eaves	12.0	0.028	0.34
Gable	8.0	0.041	0.33
Head	8.0	0.060	0.48
Sill	8.0	0.049	0.39
Jamb	22.8	0.050	1.15
Corner	10.0	0.021	0.21
Party wall/external wall	10.0	0.169	1.69
Ground floor/party wall	8.0	-0.057	-0.46
Party wall/floor	8.0	0.179	1.43
Total heat loss from junctions			11.34
Fabric element	Area (m ²)	U-value (W/m ² K)	Total (W/K)
Walls	88.6	0.261	23.12
Floor	48.0	0.201	9.65
Roof	48.0	0.268	12.82
Windows	11.4	2.200	25.08
Total heat loss from fabric elements			76.67
Overall heat loss			88.01
Junction loss as % of fabric loss			14.77

Detail	IWI	EWI
Typical	36.3%	49.36%
Improved	17.78%	14.77%

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bre The Issues

- Lack of Knowledge & Training in cold bridging and ventilation impacts
- Certification of systems and what details they cover?
- Complexity in dealing with areas – Space
- Lack of suitable cost effective solutions
- BUT... the systems are certified !

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bre What is Certified – Best or Standard Practice?

Extracts from a BBA Certified External System



4. General

4.7

A Property without rainwater goods????

The **fixing** of rainwater goods, satellite dishes, clothes lines, hanging baskets and **similar items** is **outside the scope of this certificate**.

6. Thermal Performance

6.3

“Shall provide a continuous thermal insulation layer”

The systems can contribute to **maintaining continuity of thermal insulation at junctions between elements and openings**. Details shown in Figure 2 **will** allow use of the default psi values for Accredited Construction details in Emission rate calculations to SAP 2009 or the **simplified Building Energy Model (SBEM)**. Guidance on **limiting heat loss at junctions** can be found in.

Northern Ireland – Accredited Construction Details (version 1.0)

11. Risk of Condensation

11.1

“Opt In or Opt Out – Robust Details”

Designers must ensure that an appropriate condensation risk analysis has been carried out for **all** parts of a construction, including at junctions, openings and penetrations to **minimise the risk of condensation**. The recommendations of BS 5250:2011 should be followed.

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“ No need to remove expensive Soil Pipes – just insulate behind them”

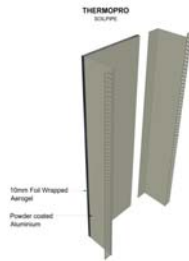
The Thermo-Pro range of profiles have been developed to provide a weather tight and thermal bridging solution for external wall insulation systems.

Key Areas of use

- Soil Pipes
- Gutters and Downpipes
- Gateposts
- Satellite Dishes
- Window Installation

Key advantages

- Faster Installations
- Reduce risk of onsite damage
- Superior Weatherproofed and pre-finished solution
- No thermal breaks in EWI
- Reduced disruption to access



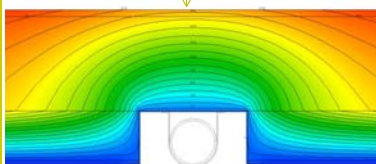
Hillingdon, London

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Without

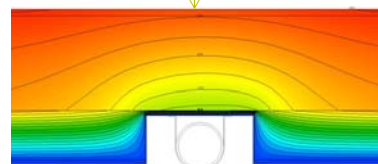
16.3°C



Linear Thermal Transmittance
 $\Psi = 0.718 \text{ W/mK}$

With

18.5°C



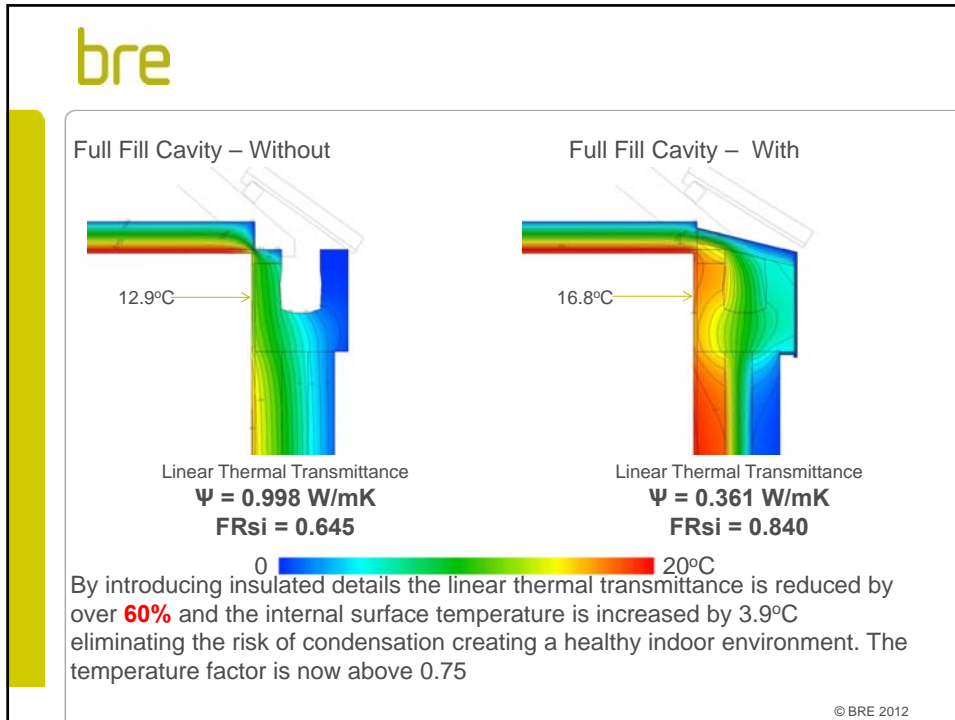
Linear Thermal Transmittance
 $\Psi = 0.207 \text{ W/mK}$

Thermal Graphics



By introducing the insulated profile the linear thermal transmittance is reduced by over **70%** and the internal surface temperature is increased by 2.2°C significantly reducing the risk of condensation creating a healthy indoor environment.

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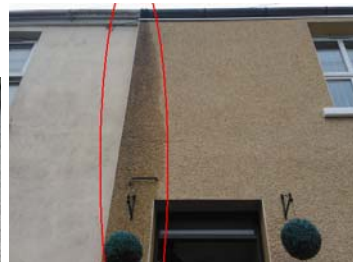




Cost of Using good details

- About 10% uplift on Costs
- £1300 increase on a end terrace or semi detached house
- The Cost of not doing it ?

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Midlands

- Non insulated floor slab below plinth
- Condensation and mould in room corners



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Problems with Moisture

Timber Frame House

Built in 1967

Insulated in 2006

Wet rot, structural failure
2012

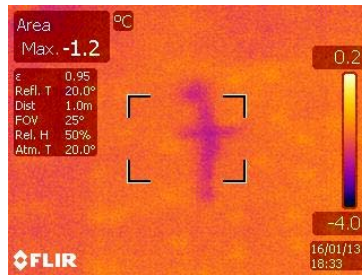
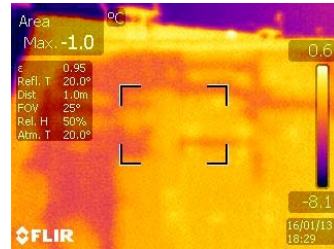
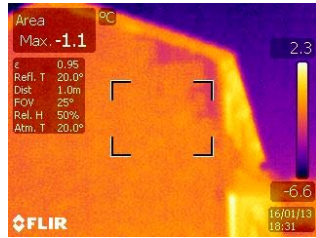
- water ingress
- poor detailing
- failure of sealant
- wet rot and dry rot



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– Thankyou for Listening