Better homes through Registered Construction Details
What changes are we faced with?

• Changes to Approved Document L1A 2013 – Fabric First Approach

• Proposed Housing Standards

• The Zero Carbon Hub “Closing the gap between Design and As Built performance” Report

All address the importance for close attention to detail in construction
But 1\textsuperscript{st} the Housing Standards Review

Optional Requirements:

- The intention is to remove the confusing overlap between Planning Policy and Building Regulations and simplify the way in which specific technical Housing Standards can be applied to new housing developments.

- The optional requirements covered will be:
  - Access (Part M)
  - Water efficiency (Part G)

There will be a base line standard in line with current Building Regulations and additional levels that are only applicable where Planning Policy identifies a need.
The Housing Standards Review
Also to be introduced:

- New Building Regulation on mandatory security standard – new housing (Approved Document Q)

- Planning Process ????- A single National Space Standard- new housing

- New Building Regulation clarifying requirements for external waste storage. Approved Document H
Building Regulations Approved Document L:

- In force from 6th April 2014 with a 6% improvement target for dwellings and 9% for commercial buildings over 2010 Regs.

- Emphasis on building fabric with the introduction of a fabric energy efficiency target (FEES)

- Minimum energy efficiency targets for air conditioning and lighting replacements for non domestic work

- No changes to the energy efficiency standards for extensions or replacement windows to homes.

- Wales has its own Approved Document L1A and L2A with a headline improvement of 8% which came into effect on July 31st 2014
Conclusion

• The good news is that all thermal performance will be assessed through the Building Regulation process and Approved Document L.

• No longer the multitude of separate codes and locally applied standards

• Key is removal of the code for sustainable homes.

• Eco bling removed and focus now on greater “as built” performance

• More work needed to ensure “as built” is as per designed plans
Important we get this energy efficiency stuff right!!!

- More thermally efficient and airtight buildings **highlight the weak points** in the construction envelope.

- **Heat loss through the weak points** is increased compared to other parts of the structure, therefore more likelihood of condensation & mould growth and unhealthy atmospheres.

- Predicted Energy savings by design will not be achieved and CO2 emissions will be higher

- These built-in latent defects are expensive to repair retrospectively.
So What’s the Big Problem?

The BuildingRegs Compliance Gap?
• i.e. Not doing what you are supposed to when you are supposed to comply with BuildingRegs and get sign-off

The Performance Gap?
• i.e. Not building the house to achieve the designed / regulated level of energy efficiency

Or Both?
• The point is, once occupied, houses usually do not achieve the energy performance set out in Part L, even if they’ve complied with BuildingRegs and got sign off.
At a practical level

Why is it important?

Condensation damage

As we move toward a lower energy building stock, performance failures can lead to fairly catastrophic building failures.

Moisture management in airtight buildings is of paramount importance.

This needs to be controlled by correct fabric design, matched with correct installation and ventilation provision.

...but in a low energy/airtight building any moisture inside the building will find the weakest point – so the effect is concentrated (not distributed). This leads to quicker, localised failures.

Photo: Ian Mawditt, Four Walls

Photo shows condensation in a new flat roof on a section where insulation had been missed – not a new problem...
The performance compliance gap
Better homes through Registered Construction Details

Thermal Bridge points at key junctions
There are three possibilities for specifying the thermal bridging:

1) Details conform with Approved Design Details or another government-approved source involving independent assessment of the construction method. In this case
- use $\Psi$ values from the ‘approved’ column of Table K1, or
- use the $\Psi$ values provided by the approved source in equation (K1) along with the length of each junction.
Here ‘Approved Design Details’ means:
- For England & Wales and for Northern Ireland: Accredited Construction Details, as listed on www.planningportal.gov.uk/buildingregulations/approveddocuments/part1/bcassociateddocuments/9/acd
- For Scotland: http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/techbooks/techhandbooks

2) $\Psi$ values have been calculated by a person with suitable expertise and experience using the guidance set out in BR 497, Conventions for calculating linear thermal transmittance and temperature factors and BRE IP 1/06, Assessing the effects of thermal bridging at junctions and around openings. In this case use those calculated $\Psi$ values in equation (K1) along with the length of each junction.

3) If neither of the above applies use equation (K2) with $y = 0.15$.

It is possible to use both 1) and 2) together for different junctions within a given calculation.
## SAP 2012 Appendix K - Table K1

<table>
<thead>
<tr>
<th>Ref</th>
<th>Junction detail</th>
<th>Approved</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Steel lintel with perforated steel base plate</td>
<td>0.50</td>
<td>1.00</td>
</tr>
<tr>
<td>E2</td>
<td>Other lintels (including other steel lintels)</td>
<td>0.50</td>
<td>1.00</td>
</tr>
<tr>
<td>E3</td>
<td>Sill</td>
<td>0.04</td>
<td>0.08</td>
</tr>
<tr>
<td>E4</td>
<td>Jamb</td>
<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td>E5</td>
<td>Ground floor (normal)</td>
<td>0.16</td>
<td>0.32</td>
</tr>
<tr>
<td>E19</td>
<td>Ground floor (inverted)</td>
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<tr>
<td>E20</td>
<td>Exposed floor (normal)</td>
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<td>E21</td>
<td>Exposed floor (inverted)</td>
<td>0.32</td>
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<td>E22</td>
<td>Basement floor</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>E6</td>
<td>Intermediate floor within a dwelling</td>
<td>0.07</td>
<td>0.14</td>
</tr>
<tr>
<td>E7</td>
<td>Party floor between dwellings (in blocks of flats)</td>
<td>0.07</td>
<td>0.14</td>
</tr>
<tr>
<td>E8</td>
<td>Balcony within a dwelling, wall insulation continuous b)</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>E9</td>
<td>Balcony between dwellings, wall insulation continuous b)</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>E23</td>
<td>Balcony within or between dwellings, balcony support penetrates wall insulation</td>
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<td></td>
</tr>
<tr>
<td>E10</td>
<td>Eaves (insulation at ceiling level)</td>
<td>0.06</td>
<td>0.12</td>
</tr>
<tr>
<td>E24</td>
<td>Eaves (insulation at ceiling level - inverted)</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>E11</td>
<td>Eaves (insulation at rafter level)</td>
<td>0.04</td>
<td>0.08</td>
</tr>
<tr>
<td>E12</td>
<td>Gable (insulation at ceiling level)</td>
<td>0.24</td>
<td>0.48</td>
</tr>
<tr>
<td>E13</td>
<td>Gable (insulation at rafter level)</td>
<td>0.04</td>
<td>0.08</td>
</tr>
<tr>
<td>E14</td>
<td>Flat roof</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>E15</td>
<td>Flat roof with parapet</td>
<td>0.56</td>
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</tr>
<tr>
<td>E16</td>
<td>Corner (normal)</td>
<td>0.09</td>
<td>0.18</td>
</tr>
<tr>
<td>E17</td>
<td>Corner (inverted – internal area greater than external area)</td>
<td>-0.09</td>
<td>0.00</td>
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<td>E18</td>
<td>Party wall between dwellings c)</td>
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<tr>
<td>E25</td>
<td>Staggered party wall between dwellings d)</td>
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<tr>
<td>P1</td>
<td>Ground floor</td>
<td>0.16</td>
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</tr>
<tr>
<td>P6</td>
<td>Ground floor (inverted)</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>Intermediate floor within a dwelling</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>Intermediate floor between dwellings (in blocks of flats)</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>P7</td>
<td>Exposed floor (normal)</td>
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<tr>
<td>P8</td>
<td>Exposed floor (inverted)</td>
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</tr>
<tr>
<td>P4</td>
<td>Roof (insulation at ceiling level)</td>
<td>0.24</td>
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</tr>
<tr>
<td>P5</td>
<td>Roof (insulation at rafter level)</td>
<td>0.08</td>
<td></td>
</tr>
</tbody>
</table>
DCLG approved Accredited Detail -
Sill junction (E3) with 0.04 Psi value

**GENERAL NOTES**
- Ensure that cavities are kept clean of mortar shots or other debris during construction.

**THERMAL PERFORMANCE OF JUNCTION**
- Install a proprietary cavity closer having a path of minimum thermal resistance path through the closer of not less than 0.45 m²K/W (manufacturer's certified data). ☑
- Minimum frame overlap to be 30mm ☑
- Ensure that partial fill insulation is secured firmly against the inner leaf of the cavity wall.

Complying with the above checklist items qualifies the builder to claim the Psi value given in Table 3 of IP 1/06 and Table K1 of SAP 2005.

**AIR BARRIER CONTINUITY**
- Ensure air barrier continuity between the window and the wall air barrier line.
- If forming the air barrier to the walls with the blockwork inner leaf or a parga coat on blocks, a flexible sealant should be installed between the cavity closer and blockwork wall.
- Flexible sealant should be applied to the junction between the plaster/plasterboard and the sill and between the sill and window frame member. ☑
- Seal all penetrations through air barrier using a flexible sealant.

Complying with all of the above checklist items will help achieve the design air permeability and may affect a reduced testing regime.

**AIR BARRIER OPTIONS**
- Plaster coat, or
- Blockwork inner leaf/parging coat applied to internal face of inner leaf with plasterboard over, or
- Plasterboard on dabs with continuous ribbon of adhesive around all openings, along the top and bottom of the wall, and at internal and external corners.

The above indicative guidance illustrates good practice for the design and construction of interfaces only in respect to ensuring thermal performance and air barrier continuity. The above guidance must be implemented with due regard to all other requirements imposed by the Building Regulations.

**MCI-WD-04 Windows and Doors. Cills.**

**Masonry Cavity Wall Insulation**
LABC Registered Construction Detail –
E3 sill junction with 0.018 Psi value

Build Up
External Masonry Cavity Wall
Masonry Outer Leaf ($\lambda = 0.77$)
Lightweight Concrete Block Inner Leaf $\lambda \leq 0.60 \text{ W/mK}$
Partial Fill Insulation
Window Sill

Points to Watch
- Cavity should be closed with a proprietary cavity closer or block of insulation
- Ensure the cavity closer is in contact with the insulation within the cavity and the window / door frame.
- Ensure cavities are kept clean of mortar spots and other debris during construction
- A flexible sealant should be applied to the junction between the plaster/plasterboard, sill board and window frame member
- Sealant should be added to the front and back of the sill board
- Ensure that the damp proof course is correctly positioned.

Calculated $\psi$-values

<table>
<thead>
<tr>
<th>Material</th>
<th>$\psi$-value W/mK</th>
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<tbody>
<tr>
<td>Inner leaf blockwork</td>
<td>0.69</td>
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<tr>
<td>Lightweight Concrete Block $\lambda \leq 0.022$</td>
<td>0.018</td>
</tr>
<tr>
<td>Cavity Insulation $\Psi-value$ W/mK</td>
<td>0.027</td>
</tr>
<tr>
<td>50mm $\lambda = 0.022$</td>
<td>0.018</td>
</tr>
<tr>
<td>100mm $\lambda = 0.022$</td>
<td>0.027</td>
</tr>
</tbody>
</table>
A SAP calculation using LABC Accredited Details

• Appendix K
  • DER 20.43 TER 20.22
  FEE 54.13
  Y = 0.077

• LABC Registered
  • DER 19.55 TER 20.22
  FEE 50.51
  Y = 0.053
So is the solution simple in practice?—Yes and No!

The Zero Carbon Hub Report highlights;

- A generally poor level of understanding across the design/build process of Psi-values
- The importance of good detailing practice
- The implications of what may seem minor variations from such designs.

- Small to medium sized builders currently have little guidance on how to deal with junctions

A number of factors can result in big differences in the energy loss calculations of junctions at the design stage and actual standards achieved during the build process:

- A limited knowledge of the implications of minor changes to details;
- The practical difficulties of building some details that look good on paper but!!;
- A lack of awareness by tradesmen of the junction detail concerned; and
- A lack of feedback to energy assessors when junction designs have changed
Better homes through Registered Construction Details

Extensive work undertaken by LABC and the Modern Masonry Alliance to make available a large range of Registered Constructions Details to make it easy for small local builders to comply

It’s important to LABC that we help local builders back into the market – the cost effectiveness of following the Registered Construction Details route rather than accepting the default values or carrying out calculations is huge.
LABC registered details
Find out more about our registered products for builders and designers.

WELCOME TO LABC

LABC is a not-for-profit membership organisation that represents all local authority building control teams in England and Wales. Our members ensure that all buildings are habitable, safe, dry and warm. With over 3,000 professional surveyors and building technicians working in local authority building control we provide a consistent national service that’s delivered locally.
LABC has a number of registration schemes where we seek to streamline the construction process for manufacturers, installers, developers, building control surveyors and the end users of buildings. Our Registered Details scheme is a certification process that proves compliance for products and systems with the building regulations, building standards and warranty standards across England, Wales & Scotland; this ensures acceptance by all local authorities across England, Wales and Scotland and makes the building control process faster, easier and cheaper by simplifying the submission route.

Our Partner Authority Scheme allows architects, developers and contractors to work with a chosen building control team to undertake all pre-application and design work, regardless of the project’s geographical location; in some circumstances, and where travel permits, that same team can undertake the site surveying work too.

LABC’s Registered Construction Details are a suite of 250 joint details giving you detailed drawings of thermal bridge junctions together with points to watch, specification and thermal properties of the key materials. In addition to offering improved Psi ($\Psi$) values, each Detail contains a checklist which can be used by the designer, constructor and building control body to easily demonstrate and achieve compliance. All details are searchable by type of junction, wall construction and insulation type.
**CONSTRUCTION DETAILS**

Use the search and filter to find the construction details you're looking for. Your current filter is displayed below.

**RESULTS:** 1 matching construction details - viewing [1 - 1]

| **E5MCPF16 SUSPENDED BEAM AND BLOCK FLOOR, INSULATION ABOVE SLAB** |
| Date of publication: 15 October 2014 |

- **Build Up**
  - External Masonry Cavity Wall
  - Masonry Outer Leaf ($\lambda = 0.77$)
  - Partial Fill Insulation
  - 100mm Aircrete Block Inner Leaf

**Appears in:**
- GROUND FLOOR, MASONRY CAVITY, PARTIAL FILL
E5MCPF16 SUSPENDED BEAM AND BLOCK FLOOR, INSULATION ABOVE SLAB

Build Up

External Masonry Cavity Wall

Masonry Outer Leaf ($\lambda = 0.77$)

Partial Fill Insulation

100mm Aircrete Block Inner Leaf ($\lambda \leq 0.11$ W/mK)

150mm Beam and Aircrete Block Infill

100mm Insulation Above Slab (0.022W/MK)

75mm Screed
Better homes through Registered Construction Details

Points to Watch
- Ensure cavities are kept clean of mortar snots and other debris during construction
- Damp proof membrane / air barrier should be lapped to damp proof course and plaster stop bead.
- Any service penetrations through the damp proof membrane / air barrier should be suitably sealed.
- Sub floor ventilation to be in accordance with manufacturers recommendations. A cavity barrier type sleeve should be used through the cavity.
- The wall insulation installed must be considered fit for purpose below the wall dpc in relation to water absorption.

Build Up
- Masonry Outer Leaf
- Partial Fill Cavity Insulation
- 100mm Aircrete Inner Leaf
- Suspended Beam And Block Floor
- Insulation Above Slab (0.022W/Mk)
- 75mm Screed

Registration Number: E5MCPF16
Registration Number: E5MCPF16

Build Up

External Masonry Cavity Wall
Masonry Outer Leaf (λ = 0.77)
Partial Fill Insulation
100mm Aircr...
Table KI SAP 2012 DCLG Approved Detail (E5) gives a Psi value of 0.16W/m²/ K
# LABC Registered Construction Details

**Masonry**

## Registered Construction Details Worksheet

<table>
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<th>Project</th>
<th>Date</th>
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<tbody>
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<th>Designer</th>
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## Assessment Stage

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<table>
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<th>Build Stage</th>
<th>Data installed</th>
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## Inspection Stage

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## Applicable Detail Reference Numbers used

<table>
<thead>
<tr>
<th>Reference No</th>
<th>Description</th>
<th>Stated U Value from Table W/mK</th>
<th>Default W/mK</th>
<th>F Value from Table</th>
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</thead>
<tbody>
<tr>
<td>e.g. ES MF1</td>
<td>Suspended basement block floor - 120mm insulation b/tiner (cold External wall)</td>
<td>0.056</td>
<td>0.16</td>
<td>0.073</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thermal Specification</th>
<th>Required λ Value</th>
<th>Product Specified</th>
<th>Stated λ Value</th>
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<tbody>
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<td>Outer Leaf</td>
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<tr>
<td>Cavity Insulation</td>
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</tr>
<tr>
<td>Inner Leaf</td>
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<td></td>
<td></td>
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<tr>
<td>Internal Flash</td>
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<tr>
<td>Floor Insulation</td>
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<td>Perimeter Insulation</td>
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<td>Roof Insulation</td>
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[LABC Logo]

[LABC Registered Construction Details]

[Concrete Block Association]

[LABSS Registered Details]
Better homes through Registered Construction Details

These details are available to download now from the LABC website

Easy to use details including:

• CAD drawings
• Hints and tips
• Construction checklist
Better homes through Registered Construction Details

For more information please go to the LABC Website

www.labc.co.uk/registeredconstructiondetails

Or call us on 020 7091 6860