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Foreword

Welcome to Technical Extra 14

Readers will recall how 2014 started with reports from around the country of record levels of rainfall. With over 1.3 million homes under cover at any one time, NHBC is acutely aware of the issues faced by both homeowners and builders at this time.

Coupled with strong winds, you won’t be surprised to learn that these conditions led to a sharp increase in claims activity, exposing defects in construction leading to water ingress; particularly those critical areas around openings to external walls and elements of roofs, including abutments. If you’ve had to revisit your sites, do take the opportunity to learn from the repairs you’ve had to undertake and ensure current work practices address any deficiencies of the past.

Learning from the past is key to reducing claims; improving standards and the direct influence this has on reducing costs and improving customer satisfaction. In this edition, we review last year’s claims activity and highlight some surprising differences from around the country, along with some all-too-familiar issues.

In line with NHBC’s first-hand experience, many commentators have been reporting continued and encouraging growth in the housing sector, with monthly figures regularly improving upon corresponding months from recent years. In this edition, we highlight some of the pressures this continues to place on materials, products and systems.

We also highlight key issues to consider should you be designing, manufacturing or installing windows. And we’ve included several good practice topics, including fixings of copings, balcony drainage and deflection heads.

The NHBC Foundation, NHBC’s research arm, has published four further reports in recent months, summarised in this edition of Technical Extra; they are freely available at www.nhbcfoundation.org. The most recent reflects on the impact regulations and the subsequent introduction of the Robust Details scheme has had on improving the sound resistance of attached dwellings.

The next edition of Technical Extra will be published in early autumn and will include details of the next edition of NHBC Standards, along with more details on the introduction of the new chapter on Waterproofing of below ground structures. Enjoy the summer.

Mark Jones
Head of House-Building Standards
NHBC STANDARDS

Annual claims review

Who should read this: Technical and construction directors and managers, architects, designers and site managers.

INTRODUCTION

It would be too easy to jump on an overall movement in the number of new claims seen by NHBC as a sure sign of changes in quality. However, we need to remember that annual claims experience is affected by a number of variables, not least variations in build volume, age and number of homes under cover and, of course, significant weather events, such as extremes in temperature, wind and/or rainfall.

That said, whilst we have seen an increase in the annual claims bill, a legacy of the long-tail nature of NHBC’s 10-year warranty cover and a relatively small number of high-cost claims related to foundations and basements, it is encouraging to see some general indicators pointing to a better quality of homes in recent years. This view is drawn not only from our claims experience, but also inspection records and, importantly, the voice of the homeowner through customer satisfaction surveys.

Not only have we seen the actual number of claims fall, we’ve also seen a drop in the number of claims per 1,000 homes under cover; a measure that takes out some of the market volatility of recent years.

A note of caution

Whilst the trend is generally one of improvement, the very latest data does signal a note of caution. As pressures to deliver increasing numbers of homes intensifies in a growing market, we must ensure the lessons learnt from the past aren’t forgotten.

The following provides high-level feedback on NHBC’s recent claims experience over the life of the 10-year warranty, helping you to design and build out defects and snags, therefore increasing customer satisfaction and reducing costs.

REQUIREMENTS

Claims experience varies between countries in the UK

It’s important to highlight from the outset that NHBC’s claims experience is different from country to country.

Whilst pitched roofs have dominated the debate over recent years, this is particularly the case in England and Wales, whereas both Scotland and Northern Ireland see significantly fewer pitched roof claims. Here, superstructure becomes the focus, in particular external walls, discussed in greater detail below.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
REQUIREMENTS (CONTINUED)

External walls

Whilst pitched roof issues have been falling, the NHBC claims experience during recent winter storms confirmed a general trend towards a higher proportion of claims related to external walls; issues related to cavity trays in particular.

Examples of some all-too-common issues exposed in recent months are shown here. This is an area that can be relatively easily addressed with a few simple steps. Our review has highlighted that the hand off between trades, for example brickwork to roofing contractors, is an important area to address that can lead to errors and, subsequently, claims.

A common area of concern is around openings, in particular the detailing of cavity trays, DPCs and flashing, along with associated works, above windows and doors, or associated with roof or chimney abutments.

Do basic errors in the positioning of the tray and associated weep vents, etc. suggest that the purpose of the tray (to divert any moisture entering the cavity back towards the external walls of the house) isn’t always understood?

This weep hole, located below the top of the flashing, suggests the cavity tray is incorrectly positioned and not lapped with the flashing.

Further investigations confirmed the tray to be too low, allowing driving rain entering the cavity to run into the room located below.

NHBC will be focusing on common issues related to external masonry walls over the coming months to help builders reduce defects similar to those described above.

Correct positioning of cavity trays

In the previous example, weep holes indicated that the cavity tray might be positioned too low. However, if we reflect on the construction process, the uppermost position of the mono roof would need to have been accurately established during construction of the external wall to ensure the tray could be located correctly.

Is this type of information always made available, and who is responsible for this? Do they know they are?

Fireplaces, chimneys and flues

Within the superstructure category, Northern Ireland also sees higher levels of claims related to fireplaces, chimneys and flues than the wider sample - an area for focus? Certainly, almost half of all claims in this area of the standards related to damp ingress around chimneys; commonly attributed to incorrect or missing trays. Health and safety issues related to flues accounted for approximately one-third of fireplaces, chimneys and flues claims, with incorrect installation or open joints being a common issue.

Basements

Significant work to address basement issues commenced in 2013. To re-cap: below-ground waterproofing failures on builds since 2005 have cost the industry in the region of £21 million, affecting nearly 890 homes. The next stage of this work is the development of a new NHBC Standards chapter dedicated to basements, which is due to be included in the 2015 edition of NHBC Standards.

In the meantime, further information on what can be done to reduce the risk posed by basements is given in the Basement Information Centre’s guidance document Basements for Dwellings. This is available free of charge to NHBC registered builders and professional subscribers to NHBC Standards via Standards Plus.
Annual claims review

REQUIREMENTS (CONTINUED)

Pitched roofs

As reported in previous issues of Technical Extra, claims related to pitched roofs are dominated by mortar issues. Claims volumes in this area have started to plateau and perhaps fall; however, it is too early to predict the levels we can hope to see moving forward, and the true effect of recent work to raise awareness and improve standards. What is clear is that early year performance of homes benefitting from NHBC's warranty cover are attracting a lower number of claims than older generations. If this trend continues, and in conjunction with improved quality, lower levels of claims can be expected.

**Given the critical function of the roof we mustn't become complacent however and it is worth reflecting on NHBCs recent findings, changes and guidance:**

- **Pitched roofs dominate overall claims numbers:** over 60% of all claims in years 3-10 relate to pitched roofs.
  
  **Action:** review NHBC guidance on pitched roof claims. Both builder and subcontractor should be fully aware of the latest version of *Chapter 7.2 – Pitched roofs*.

- **Dormers, abutments and dry systems.**
  
  **Action:** review NHBC guidance on pitched roof claims. Both builder and subcontractor should be fully aware of the latest version of *Chapter 7.2 – Pitched roofs*. Any break in the roof line, such as dormers, velux or chimneys requires, careful design and construction. Ensure dry system components are compatible with the pitch and tile profiles of the roof.

- **Mechanical fixing:** where ridges and hips are bedded on mortar, Chapter 7.2 states these areas must also be mechanically fixed.
  
  **Action:** ensure that all ridges and hips that are bedded on mortar are also mechanically fixed.

- **Mortar to verges:** where verges are bedded on mortar, ensure they are formed by either bedding and pointing immediately or bedding and then pointing following initial ‘stiffening’ of the mix. Verge failure due to incorrect mortar placement is a common defect and expensive to repair.
  
  **Action:** at verges, ensure tiles or slates are bedded in one operation on roofing mortar and have a minimum width of 100mm.

- **Correct mortar mix:** analysis of claims has highlighted that those related to mortar account for over 50% of all pitched roof claims. Whilst this is beginning to drop due to a move to dry systems, they still dominate.
  
  **Action:** if you have not completely moved to dry systems, ensure the correct mortar mix is used. Roofing mortar should be 1:3 cement:sand with plasticiser. The mix should be based on sharp sand with soft sand added to achieve workability. The proportion of sharp sand should not be less than one-third of the total sand content.

- **Fixing schedules:** fixing schedules should be used and available for inspection. In our most recent survey, we found that one-quarter of all sites surveyed did not have a fixing schedule available.
  
  **Action:** ensure a fixing schedule, including details to ridges and hips, etc., is used and available on site for review.
**REQUIREMENTS (CONTINUED)**

### Claims in years 0–2

Claims made in the first two years post-completion are dominated by services, fixtures and finishes, at circa 40% in 2013, with internal services the predominant subcategory. Superstructure claims are also significant at 33%, with doors, windows and glazing dominating.

Considerable time and money is being spent in these areas, and a review of responses highlights that this type of issue is likely to influence how homeowners judge the quality of new homes and may consequently impact on customer satisfaction results.

### Internal services

Over two-thirds of internal services claims relate to the installation of services; electric, hot/cold water, soil and waste and heating. Failure to perform adequately is commonly recorded as the reason for the claim, with example issues taken directly from NHBC investigations being:

- inadequate water temperature supplied to radiators
- radiator undersized for room
- thermostatic radiator valves omitted
- leak and resulting damage from mains water supply within kitchen unit
- unsecured pipework creating water hammer as taps are turned on and off
- incorrect electrical supply leading to operating issues with bathroom light/fan.

### Doors, windows and glazing

Over half of all superstructure issues are related to doors, windows and glazing. Inadequate installation and sealing are reoccurring issues in both areas, with examples from NHBC claims files including:

- leak around roof light
- door seal to the bottom of the door has come away
- drafts due to window gaskets not adequately sealing
- excessive gap to underside of internal doors
- water entering the property beneath front door
- seal around door inadequate, investigations found frames had not been fitted plumb and square
- mould growth to bay window, background ventilation required but not provided
- window and door seals not being adequately compressed and aren’t therefore providing an air tight seal.

Further information on standards and regulation requirements for windows is provided in a separate article in this edition of Technical Extra.

Do you know the specification of the window you’ve ordered and, more importantly, received?

The importance of window U-values is well known, but the glazing g-value is also critical when considering overall performance, particularly as fabric efficiency becomes increasingly critical. Specifying better g-values enables a trade-off elsewhere, but ensuring the windows supplied and installed meet the design specification is then brought sharply into focus.

As is the case with substitution of any building element, ensuring windows achieve the required performance specification is vital.

### YOU NEED TO...

- This article has highlighted some of those claims NHBC typically sees over the life of the warranty. It is recommended that readers reflect on how they might be able to reduce instances of defects occurring generally and tackle the above specifically.
Windows and associated guarding have an important role in ensuring new homes are weathertight, energy efficient, safe and secure. This article considers some of the requirements, standards and regulations affecting them and their installation.

Evidence suggests that modern windows made from plastic, timber or metal now perform better in a number of key areas than they ever have. Improvements in the methods by which windows are manufactured can, in part, be attributed to the availability of robust British Standards.

NHBC Standards Chapter 6.7 ‘Doors, windows and glazing’ lists relevant British Standards for windows manufactured from various materials, including:

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<tr>
<th>Standard</th>
<th>Description</th>
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<tr>
<td>BS 644</td>
<td>Timber windows and doorsets. Fully finished factory-assembled windows and doorsets of various types. Specification</td>
</tr>
<tr>
<td>BS 4873</td>
<td>Aluminium alloy windows and doorsets. Specification</td>
</tr>
<tr>
<td>BS 6510</td>
<td>Steel-framed windows and glazed doors. Specification</td>
</tr>
<tr>
<td>BS 7412</td>
<td>Specification for windows and doorsets made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles</td>
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</table>

These standards cover the majority of windows manufactured and installed in the UK; however, where a particular window does not comply with the British Standards listed above, NHBC asks for an equivalent proof of performance. This might be through compliance with other relevant standards or satisfactory independent assessment or certification, such as that offered by British Board of Agrement (BBA).

Windows that are coupled together to form curtain walling systems of one storey or more in height should be tested to Centre for Windows and Cladding Technology (CWCT) standards in accordance with Chapter 6.9 ‘Curtain walling and cladding’.

PVC-U windows have been used in new homes for many years and, although there were some quality issues with the early fabrications, the introduction in 1991 of BS 7412 helped to bring about significant improvements. To ensure that the ongoing production of windows was in accordance with BS 7412, Chapter 6.7 ‘Doors, windows and glazing’ asked for PVC-U windows manufactured under this standard to also hold a BSI Kitemarking or equivalent.

Evidence of further recent improvements in the production of PVC-U windows has prompted NHBC to review the current guidance, which has resulted in a change to our Standards, enabling PVC-U windows that fully comply with BS 7412 to be accepted without the need for an additional quality mark.

It should be noted that insulated glass units manufactured to BS EN 1279 should still be part of a third-party quality mark scheme.

Building regulations

All designers, builders and building control professionals should be familiar with the Building Regulations and the Approved Documents which support the functional requirements and desired outcomes set by them.

However, there are more than a few areas and scenarios where the guidance in the Approved Documents either doesn’t cover a situation or the proposal to meet the functional requirements does not exactly fit the exemplar situation demonstrated in the Approved Documents or other guidance.

For Building Regulations advice and support, call 0844 633 1000 and ask for ‘Building Control’ or visit www.nhbc.co.uk/bc
Designing, manufacturing or installing windows?

STANDARDS (CONTINUED)

Referenced in them. In situations such as this, it is down to the building control body to make a judgement on whether the suggested solution meets the functional requirements, and this can often lead to uncertainty and indeed different interpretations between builders and building control bodies.

Where situations like this exist, NHBC works with the Government and other building control bodies through the Building Control Alliance (BCA) to develop common guidance which can be used by the industry to demonstrate compliance. BCA Guidance Notes are endorsed by the Association of Consultant Approved Inspectors (ACAI), Local Authority Building Control (LABC) and are reviewed by the Department of Communities and Local Government (DCLG) before publication.

One situation which occurs more often than you think is that of French windows and window openings above ground floor that have low cill heights; the BCA have recently published guidance in this area.

The Approved Documents provide recommendations for the minimum height of windows above floor level and guarding for windows where they fall below these levels.

Increasingly, designers are incorporating deeper windows or French doors with low level cills into their dwelling designs. The cills to these windows can provide platforms to aid climbability by children. As such, the recommendations for guarding height to windows may not be appropriate to afford the safety of the occupants and achieve compliance with the functional requirements.

French windows

When considering guarding to French windows, a minimum guard height of 1,100mm measured from the finished floor level is required to ensure adequate protection from falling. The guarding should in all cases be non-climbable. This figure is almost consistent with the guidance given in BS8213-1, which recommends 1,120mm high guarding for French windows (when sited above ground-floor level).

Where an upstand is formed (up to 300mm high) to the base of the opening, an 800mm guard height should be maintained above this level.

Window openings in external walls with cill heights between 300mm and 800mm above finished floor level

According to ChildData, 50% of four-year-old children can step up 410mm and 3% can step up 550mm. Any cill height lower than 600mm may therefore be considered climbable by children.

According to ChildData, only 5% of four-year-old children are taller than 1,200mm, so most would be fairly stable standing on an upstand if a minimum guard height of 700mm were to be maintained.

Diagram 1 - Minimum guard heights to French windows.

Diagram 2 - Indicates acceptable guarding arrangements where parapet heights are between 300mm and 600mm above finished floor level.

For Building Regulations advice and support, call 0844 633 1000 and ask for ‘Building Control’ or visit www.nhbc.co.uk/bc
Diagram 3 - Indicates acceptable guarding arrangements where parapet heights are between 600mm and 800mm above finished floor level.

STANDARDS (CONTINUED)

When considering balcony floor level, account need not be taken of fixed furniture such as window seating.

Note: Where the overall guard height exceeds 1,100mm from finished floor level, this will conflict with the maximum 1,100mm dimension required for the window to be suitable for escape. A check should be made in these circumstances to ensure that there is an alternative window in the room suitable for escape, or that if acceptable, a suitable protected escape route has been provided. This should always be checked first with your building control body to ensure that this is an acceptable alternative.

Window restrictors

Window restrictors are not considered to be an alternative to a permanent guard in any of the diagrams in this guide. Reference should be made to BCA Guidance Note 1 - Glass guarding and restrictors to low level windows above ground floor level in dwellings.

BCA Guidance Notes can be downloaded for free from www.buildingcontrolalliance.org.

YOU NEED TO...

- Ensure that windows comply with NHBC requirements for windows, which can be found in Chapter 6.7 ‘Doors, windows and glazing, and, where multiple windows are coupled together and more than one storey in height, Chapter 6.9 ‘Curtain walling and cladding’.
- Ensure your sites comply with building regulation requirements in relation to guarding and the use of window restrictors.
REGULATION AND COMPLIANCE

Part L in Wales

Who should read this: Technical and construction directors and managers, architects, designers and site managers.

INTRODUCTION

Technical Extra 13 focused on the changes to the Part L 2013 in England, which came into effect in April 2014. In this article, we highlight some of the changes that the Welsh Government will be making to Part L in Wales and the different approaches that they will be making towards zero carbon homes.

GUIDANCE

The steps outlined in Part L 2014 for Wales are similar to those in England, but there are some minor differences.

The Welsh Part L uses a recipe approach identical to that in England, and discussed in greater detail in Technical Extra 13, which will benefit those who build in England and Wales with similar house types.

The significant difference between the two sets of regulations is that the Welsh Government is not including a Fabric Energy Efficiency Standard, as has been the case in England. However, to ensure that the fabric of the new home still performs adequately, the elemental backstops have been significantly tightened and are now mandatory; limiting the potential to relax the performance of those elements when altering the ‘recipe’.

<table>
<thead>
<tr>
<th></th>
<th>2010 value</th>
<th>2014 mandatory value</th>
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<tbody>
<tr>
<td>Roof (W/m²K)</td>
<td>0.20</td>
<td>0.15</td>
</tr>
<tr>
<td>Wall (W/m²K)</td>
<td>0.30</td>
<td>0.21</td>
</tr>
<tr>
<td>Floor (W/m²K)</td>
<td>0.25</td>
<td>0.18</td>
</tr>
<tr>
<td>Party wall (W/m²K)</td>
<td>0.20</td>
<td>0.2</td>
</tr>
<tr>
<td>Windows/doors (W/m²K)</td>
<td>2.00</td>
<td>1.6</td>
</tr>
<tr>
<td>Air tightness (m³/hr.m²)</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Opening area: Same as actual up to 25% of floor area

External walls (W/m²K): 0.18
Party walls (W/m²K): 0
Floor (W/m²K): 0.13
Roof (W/m²K): 0.13
Windows (W/m²K): 1.4 (g=0.63)
Air tightness (m³/hr.m²): 5.0
Thermal bridging (W/m²K): Calculated using the lengths of junctions in the actual dwelling and the psi values provided in Appendix R
Ventilation type: Natural (with extract fans)
Gas boiler: 89.5% (SEDBUK)
GUIDANCE (CONTINUED)

Existing homes
Perhaps the most significant changes to Part L 2014 in Wales are the requirements for consequential improvements to existing homes, which may affect NHBC builders who operate in the domestic home improvement sector.

Alongside strengthening how much existing thermal elements require upgrading when replacing or removing them, there will now be a need to upgrade an existing house if works are carried out to extend the habitable space either by extending, adding a loft conversion or converting the garage. In brief, the measures that can be done are:

- If the dwelling has uninsulated or partially insulated cavity walls, fill with insulation where suitable (may not be suitable for sites exposed to driving rain).
- If there is no loft insulation or it is less than 200mm thick, provide 250mm insulation or increase it to 250mm.
- Upgrade any hot water cylinder insulation as follows:
  - If the hot water cylinder is uninsulated, provide a 160mm insulated jacket.
  - If the hot water cylinder has an insulated jacket less than 100mm thick, add a further insulated jacket to achieve a total thickness of 160mm.
  - If the hot water cylinder has factory-fitted solid foam insulation less than 25mm thick, add an 80mm insulated jacket.

For a small extension less than 10m² in floor area, the consequential improvement is limited to upgrading the loft insulation only if required.

Part L 2014 for Wales is implemented on 31 July 2014; therefore, for submissions made before that date, Part L 2014 will not apply, providing work has commenced on site on or before 31 July 2014.

For more information on Part L 2014 for Wales, visit NHBC TechZone at www.nhbc.co.uk/techzone.

YOU NEED TO...

- Note the changes highlighted above and consider whether these and the transitional arrangements may impact your sites.
GUIDANCE AND GOOD PRACTICE

Fixing of copings

Who should read this: Technical and construction directors and managers, architects, designers and site managers.

INTRODUCTION

This article provides guidance for the fixing of copings to gable walls. It is important to ensure that the design provides a secure, weathertight and durable fixing arrangement.

GUIDANCE

Copings have been successfully used to provide weathering to the tops of masonry gable walls for many years. However, NHBC has recently become aware of a number of instances where copings have become dislodged and, in the more extreme cases, have resulted in the coping falling from the wall.

In addition, there are specific considerations for the correct detailing of glass reinforced plastic (GRP) copings when used in combination with timber or steel framed buildings.

All copings, including those manufactured from natural stone, reconstituted stone and GRP, need to resist mechanical forces from gravity, wind and building movement, in addition to the effects of moisture and frost. Fixing them securely is a challenge, and will generally require some form of mechanical fixing.

To assist the industry in getting this important detail consistently right, NHBC has developed the following technical principles that will help in the detailing of a fixing method that is secure, weathertight and will provide satisfactory in-service performance for the design life of the building.

Masonry construction

In addition to resisting gravitational forces, the fixing method needs to be designed to resist wind uplift and be suitably durable. Stainless steel ‘L’ shaped brackets with dowel bars that fit into restraint holes on the end face of copings are commercially available and can be used to provide suitable restraint (see Figure 1).

Figure 1

The brackets and their fixings should be of a grade of stainless steel of appropriate durability for the location; for example, Type 304 to BS EN 10088-2. The designer will also need to consider the length and gauge of the fixing, which needs to be securely located into a solid piece of masonry to ensure that the bracket is suitably fixed to the top of the gable wall.

The critical role of the DPC beneath a coping requires it to be robust. The specification of a DPC that achieves a good key with mortar is the first step. Usually, this should either be a bitumen-based material in accordance with BS 6398 or another...
Fixing of copings

GUIDANCE (CONTINUED)

material that has been independently assessed and is suitable for the purpose. The DPC also needs to be the full width of the wall, fully bedded in mortar and supported over the cavity to prevent it sagging (see Figure 2).

Figure 2

Fixing methods that penetrate the DPC need to be well designed to ensure that they don’t create a weakness in the detail’s ability to resist water. This can be achieved by extending the lower dpc under the bracket and installing the next section of dpc over to create a lap that covers the fixing point (see Figure 3).

Glass Reinforced Plastic (GRP)

Where GRP copings are used they should be fixed in accordance with the manufacturer’s instructions and include a DPC. The detail in Figure 4 shows a typical section through a gable wall of a timber framed construction with a GRP coping.

The design of this detail should allow for normal downwards movement in the timber frame. Further guidance can be found in Chapter 6.2 ‘External timber framed walls’ of the Standards; in particular, the guidance in Appendix 6.2-C can be used to determine the size of the closing gap between the masonry wall and the underside of the coping.

Figure 3

YOU NEED TO...

Follow the further guidance will be published in the NHBC Standards 2015. However, in the interim, you should adopt the principles set out in this article at the earliest opportunity and ensure that the design and fixing of copings to all walls provides a secure, durable and weathertight detail.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
Who should read this: Technical and construction directors and managers, architects, designers and site managers.

INTRODUCTION

Last year was a good year for housebuilding with NHBC figures showing an approximate 28% increase in new home registrations from 2012; the best year since 2007. Although there is still a way to go before we reach the average volumes seen over the past 20 years the picture is clearly one of improvement. With increased volumes, the industry is faced with a new set of challenges related to materials, products and systems; we explore some of the issues.

GUIDANCE

Whilst it is clearly welcomed, the rapid increase in volumes has generated significant problems for house builders, caused by the limited availability of certain construction materials, products and systems. Extensive time periods for delivery are being quoted, resulting in some builders moving towards the use of alternatives or substitutes, which is absolutely fine, providing that they actually meet the performance demands of the building.

NHBC’s requirements for materials can be found in Chapter 1.1 ‘Introduction and Technical Requirements’ and Technical Requirement R3 Materials requirement. Typically, materials used for critical functions should be in accordance with a relevant British Standard and used in accordance with the relevant Code of Practice, or have been satisfactorily assessed by an appropriate independent technical approvals authority.

It is also important to remember that changes in the material specification may also lead to changes in the design. And where these affect the structure, they should be undertaken in accordance with Technical Requirement R5 ‘Structural design requirement’

It is appreciated that similar materials will have similar properties, but often, there are subtle differences that could have a big impact on in-service performance. Building designers need to be sure that substitute materials will still provide satisfactory performance. Key performance areas to consider include:
- structure and stability
- durability
- acoustics
- thermal properties
- fire.

And, of course, it’s not just the alternative or substitute materials, products and systems themselves, careful consideration needs to be given to ensure they are specified and installed in a manner that ensures appropriate in-service performance, which includes satisfactory integration into the building.

One recent example related to the use of concrete blocks. The originally intended block was unavailable,
so it was substituted for a similar block. However, there were subtle differences in some of the performance characteristics that required the design of the structure to be re-checked. It is clearly much better to consider these issues and design out problems before the product is installed.

This is a good example of how important it is to check the specific installation details for a particular product. Technical guidance for acceptable design, materials and sitework can be found in NHBC Standards.

NHBC Standards & Technical has noticed an increase in contacts to the Technical Helpline relating to the use of alternative materials, products and systems, and is pleased to provide technical guidance that ensures compliance with our Technical Requirements. NHBC inspectors, engineers, surveyors and Project managers can also offer you technical support.

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**YOU NEED TO...**

- If you are considering the use of alternative or substitute materials, products or systems, make sure they, and the manner in which they are used, comply with NHBC Standards. If in doubt, [contact the Standards and Technical helpline on 01908 747384](tel:01908747384) or [email technical@nhbc.co.uk](mailto:technical@nhbc.co.uk).
Making sure that rainwater is safely disposed of is fundamental to good building design. In this article, we take a look at the principles of balcony drainage and why it is so important that the potential effects of rainwater runoff are ‘fully considered’, particularly on large multistorey buildings where accumulation may be an issue and individual balconies may be less than 6m² in area.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
Balcony drainage

GUIDANCE (CONTINUED)

A balcony on the West Coast in Scotland may be quite different to the same building if it was located on the East Coast in England. Similarly, balconies on a west-facing façade may be more exposed to those on the east-facing façade, regardless of where the site is located. It is important to remember that standard balcony designs may need to be adjusted to ensure suitable performance in areas where the exposure to wind and rain is likely to be more severe.

Although currently there is no specific advice to determine at which point gutters and downpipes should be provided to balconies less than 6m², by understanding the amount of water that is likely to accumulate, the designer is in a much better position to assess the effects of runoff on the building and make an informed decision.

If the amount of water that is likely to accumulate is small and the building designer makes a decision that water can be disposed of either through a chute or over the balcony edge, potential effects on the building and surrounding surfaces need to be assessed.

It is important that water is directed away from the building and ejected beyond the façade, and whilst this can be achieved quite simply with projecting balconies, it will be much harder with inset-type balconies or winter gardens. Water directly discharging or being blown back on to the façade, particularly those constructed with absorbent materials, could lead to frost damage, increase the risk of water ingress to the building or result in unsightly water staining of the façade.

Consideration should be given to where water will eventually end up. A large number of small balconies discharging onto a hard or soft landscaped area, or a single balcony discharging over a footpath or entrance door, can all cause significant problems, which should be designed out.

The principles outlined above are just as relevant to balconies that are constructed with open slatted decking with soffit trays collecting water beneath. If the predictions for future increased rainfall intensities prove to be correct, the importance of getting drainage strategies right has never been more important. By considering how water from balconies will affect the building at the design stage, problems can be avoided and the success of the building design improved.

YOU NEED TO...

■ Where multiple balconies are proposed on multistorey buildings without a managed system of rainwater gutters and downpipes, you will need to demonstrate that the effects of rainwater runoff have been considered and the design will not lead to adverse effects on the building or surrounding area.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
Deflection heads

Who should read this: Technical and construction directors and managers, engineers, architects and site managers.

INTRODUCTION

Deflection heads can be a critical junction which may be overlooked.

GUIDANCE

In 2011, NHBC introduced pre-plaster, fire-safety inspections to individual apartments.

A common topic for discussion during these inspections is deflection head details and service penetrations. Deflection heads are designed to accommodate movement in multistorey buildings as the building becomes loaded; without these provisions, walls, services and finishes could be damaged by settlement.

Typically, designers plan for 10mm movement in each floor level, but this should be checked on your site as more or less may be required.

Plasterboard manufacturers have details for the construction of wall types and deflection heads, and these details must be followed on site to comply with NHBC Standards.

Where services penetrate compartment or separating walls, or walls protecting escape routes, these services are required to be effectively fire stopped, and where this coincides with a deflection head, it may be necessary for these penetrations to also allow for movement.

YOU NEED TO...

■ Service penetrations should be carefully planned and organised.
■ Follow manufacturer guidance and design details when constructing walls.
■ Choose appropriate materials for fire stopping, ensuring manufacturer details are followed and operatives are trained and competent to do the work.
■ For further advice on compliance, contact your NHBC Building Inspector.
GUIDANCE AND GOOD PRACTICE

NHBC Foundation

Who should read this: Technical and construction directors and managers, architects, designers and site managers.

INTRODUCTION

The Foundation is NHBC’s research arm; delivering high-quality research and practical guidance to help the house-building industry address the considerable challenges of delivering 21st-century new homes. Set up in 2006, the Foundation has now concluded over 70 research projects and published over 50 reports on a wide variety of subjects, from 'Ageing and airtightness' to 'Zero carbon homes'. All Foundation reports are available to download free of charge at www.nhbcfoundation.org.

GUIDANCE

Here are summaries of the latest publications.

Low and zero carbon technologies in new homes - learning from the experiences of consumer and on-site sales teams (NF 53)

New research by the NHBC Foundation has revealed that homeowners are unable to take advantage of the benefits of low and zero carbon (LZC) technologies because they do not understand how they work.

Building on earlier research presented in NF42 A survey of low and zero carbon technologies in new housing, published in May 2012, this new research is an in-depth study by the University of Reading of six homes across four separate developments. The report shows that most homeowners said they were comfortable using the LZC technologies incorporated in their home, and would recommend it to a friend. But unfortunately, none were able to demonstrate an understanding of how, in principle, the technologies such as solar panels or energy saving heat pumps operated.

The study also includes interviews with sales teams across six developments, and makes a number of recommendations for house builders to help understanding of LZC technologies.

To view and download the report, please visit www.nhbcfoundation.org/lzctechnologiesinnewhomes.

Review of co-heating test methodologies (NF 54)

As our understanding of the issues involved in delivering energy-efficient housing has developed, there has been growing concern about the performance gap between design expectations and what is built.

The co-heating test, designed in its present form by Leeds Metropolitan University, provides a means to measure as-built performance. It works by heating the interior of a building to a uniform temperature and recording the amount of electrical energy needed to retain this temperature over a period of around two to three weeks.

Experts from seven different organisations carried out a programme of co-heating tests on the same houses. The research found that results varied between test organisations, but that it was possible to modify the test approach (i.e. by reducing the effect of solar heat gain) to reduce variation in results.

To view and download the report, please visit www.nhbcfoundation.org/coheatingtest.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk

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GUIDANCE (CONTINUED)

Cellulose-based building materials - use, performance and risk (NF 55)

Interest and awareness about the embodied energy associated with the production, use and disposal of construction materials remains topical, resulting in traditional cellulose-based building materials such as thatch, cob, hemp and lime or straw bales being re-examined as potential low-impact building materials, products and systems.

This report provides a brief history of cellulose-based building materials, and reviews the current developments in their use. It looks at the use and performance issues of such materials, examining the potential benefits and associated risks - informing the debate and resulting in a better understanding about the use of low-impact building materials. In addition, the report provides examples of recent projects built in the UK.

To view and download the report, please visit www.nhbcfoundation.org/cellulosebuildingmaterials.

Sound progress - a review of homeowner feedback on noise in new homes (NF 56)

The NHBC Foundation has reported an encouraging drop in noise complaints by owners of new attached homes following the introduction of tough new industry standards in 2003.

The report 'Sound progress: a review of homeowner feedback on noise in new homes' looks at feedback to NHBC from owners of new homes built since the introduction of these standards to see whether these changes have led to a reduction in concerns.

The main finding from this study is a significant reduction in noise-related concerns from owners of new attached homes since 2004:

- For attached homes first occupied in 2004, about seven households per 1,000 contacted NHBC about noise problems. For homes first occupied in 2010, this was down to four per 1,000.

- Since 2004, there were progressively fewer concerns related to sound transmitted through the structure from adjoining homes.

The research also looked at noise contacts from owners of new detached homes. These owners were more likely to contact NHBC in relation to noise issues than those living in attached homes, and creaking floors were the most common problem highlighted.

Of the noise concerns raised by owners of both attached and detached homes (including a variety of noises from the fabric and services), most could be avoided by taking additional care during construction and following accepted good practice.

To view and download the report, please visit www.nhbcfoundation.org/soundprogress.

YOU NEED TO...

- This article is for general interest. There are no actionable requirements, although readers are advised to note the findings of the reports.

- If you have any doubts as to whether NHBC requires additional information, discuss this with your normal NHBC contact and/or Standards and Technical on 01908 747384.
TECHNICAL NEWS

ANDROID VERSION OF NHBC FOUNDATION DEPTH CALCULATOR APP

Since September, over 1,500 registered builders, developers and professional subscribers have downloaded the iOS and Windows version of the new Foundation Depth Calculator app. Since the launch, there has been a clear demand for the app to be available on Android systems.

NHBC has recently launched the Android version of the app; now, more of our customers can benefit from this free tool to assist in calculating foundation depths.

For further information or to watch the short demo video, visit www.nhbc.co.uk/apps.

NHBC is embracing the opportunity to develop further targeted, standard-raising mobile applications, so watch this space for future announcements.

TECHNICAL ALERT – CONCRETE FACING BRICKS

As a result of the upturn in house-building activity and the associated shortage of some building materials, we are becoming increasingly aware of situations where ‘substitute’ materials, products and systems are being used on site.

NHBC issued a Technical Alert to the industry advising of issues that might result from this, sighting concrete facing bricks as an example.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
INFORMATION AND SUPPORT

NHBC STANDARDS PLUS

NHBC Standards Plus is the fully interactive online version of the NHBC Standards that includes a range of supplementary technical information all in one place.

It’s available FREE to registered builders, developers and subscribers to NHBC Standards.

Benefits of NHBC Standards Plus:
- Free, fast online access available 24/7 - suitable for site, office and home-based working.
- All in one place - a single, fully interactive digital publication with extensive technical guidance and support.
- Colour coding to improve navigation.
- Built-in ‘word search’ function.
- Extra technical content, such as videos and Technical Guidance Notes, filtered by Standards Chapter.
- An option to print, save or forward sections of information.
- Storage of bulky documents is reduced.

For further information, including a demonstration video showing how it works, please visit www.nhbc.co.uk/StandardsPlus.

REMEMBER YOU CAN USE NHBC HUG FOR DELIVERY OF INFORMATION TO HOME BUYERS

Achieving Part L compliance can be challenging particularly as the guidance concerning provision of information to homeowners has been strengthened.

NHBC HUG can be an effective way of:
- Ensuring that the homeowner is provided with the essential design principles as well as the operating and maintenance instructions for the building services upon completion.
- Ensuring the homeowner is given the EPC with the associated recommendations report, together with the data used to calculate the DER/TER and TFEE/DFEE rate.
- Keeping an electronic version of the TER/DER, TFEE/DFEE input data file, to help the occupier if they later decide to alter or improve their home.

Visit www.nhbc.co.uk/Productsandservices/homeuserguide/ for more information.

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
INFORMATION AND SUPPORT

A FULL SERVICE TO MEET YOUR PART L COMPLIANCE NEEDS

Whilst our Part L services are available individually, the key benefit of using NHBC for all your Part L requirements is that we will manage seamless communications between our teams efficiently and effectively, reducing the amount of time you spend co-ordinating your compliance.

- Building Control: When you use our Part L services, we forward compliance documents directly to NHBC Building Control for you, preventing unnecessary delays.
- Standard Assessment Procedure (SAP): With over 20,000 energy ratings produced every year, our fast and efficient service delivers your SAP ratings on time, every time. When SAP is combined with NHBC Building Control, you will only need to submit your plans and drawings once and we will pass the design stage SAPs straight to Building Control to clear your Part L condition – saving you time and effort.
- Air Leakage Testing (ALT): We will provide our partner, BSRIA, with your DER figures from the SAP ready for testing. They’ll send us (and you) the test results so they get to NHBC Building Control right away. And we have the APR so that we can get the EPC done right away too!
- Energy Performance Certificate (EPC): Our co-ordination of your Part L work means the EPCs are ready for you just when you need them – no delays.
- Home User Guide (HUG): This is available free to our registered builders and developers when selling homes with a Buildmark warranty. Our unique secure online portal for homeowners is an ideal place for you to give homebuyers all the information you now have to give them such as EPCs. By using our Part L services, we will automatically upload all the information for you. (please leave room for an image around here).

Let us manage your Part L compliance needs so we can save you time, effort and money.

COMMERCIAL BUILDING CONTROL

NHBC’s Building Control Service is also available for non-residential buildings. This may be helpful if you are developing a school or community building as part of your site.

Dealing with NHBC makes the building control process simpler. NHBC offers the following support:

- Free advice and visit to your office.
- Dedicated surveyor contact.
- Experience of alternative solutions.
- Quick turnaround of email queries and approvals.

Recent projects include new buildings, as well as fit-outs and alterations to existing properties.

NHBC provides Building Control Services across all sectors and can assist with mixed-use or stand-alone non-residential buildings. NHBC is already working with some of the UK’s largest blue chip companies and could help you too.

For general enquiries or to request a building control quote, please contact:
0844 633 1000 and ask for ‘Sales’.
Email: sales@nhbc.co.uk

For technical enquiries and guidance on the building regulations, please contact:
0844 633 1000 and ask for ‘Building Control’
Email: buildingcontroladmin@nhbc.co.uk

For technical advice and support, call 01908 747384 or visit www.nhbc.co.uk
Useful contacts for technical information and advice

NHBC technical advice and support
Tel: 01908 747384
Email: technical@nhbc.co.uk
Web: www.nhbc.co.uk/builders/technicaladviceandsupport

Technical Extra
Previous editions of Technical Extra are available on our website at www.nhbc.co.uk/Builders/ProductsandServices/TechnicalExtra/

NHBC Standards
Buy online at: www.nhbc.co.uk/nhbcs/shop/technicalstandards or access the new digital format Standards Plus via the NHBC Extranet at: www.nhbc.co.uk/builders/NHBCExtranet

Building Regulations
For guidance on issues relating to Building Regulations, please visit NHBC’s TechZone at www.nhbc.co.uk/techzone

Building Control
For Building Control queries, please call 0844 633 1000 and ask for ‘Building Control’, or email buildingcontroladmin@nhbc.co.uk.

Engineering queries
For Engineering queries, please call 0844 633 1000 and ask for ‘Engineering’.

NHBC Foundation research
The NHBC Foundation facilitates research and shares relevant guidance and good practice with the house-building industry.
www.nhbcfoundation.org

Training
For information about training, please go to www.nhbc.co.uk/training, call 0844 633 1000 and ask for ‘Training’, or email training@nhbc.co.uk.

The Zero Carbon Hub
The UK Government has set out an ambitious plan for all new homes to be zero carbon from 2016. The Zero Carbon Hub helps you understand the challenges, issues and opportunities involved in developing, building and marketing your low and zero carbon homes.
www.zerocarbonhub.org

NHBC Clicks & Mortar e-newsletter
NHBC regularly distributes information on a range of industry topics, including new products and services, the building industry market, house-building news and house-building statistics. To receive this industry information, please register at: www.nhbc.co.uk/newsandcomment/registerfore-news

General enquiries
For all other enquiries, including ordering products and services, please call 0844 633 1000, and ask for ‘Sales’.