



Department of  
**Finance and  
Personnel**

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# **Building Regulations (Northern Ireland) 2011**

## **Phase 2 Consultation**

### **Regulatory Impact Assessment**

#### **Draft for Consultation**

June 2011

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## Introduction

Following consultation, the Building Regulations primary legislation “The Building Regulations (Northern Ireland) Order 1979” was amended in March 2009 by “The Building Regulations (Amendment) Act (Northern Ireland) 2009” to provide the power to make building regulations supported by guidance.

The Department of Finance and Personnel is exercising the power to introduce guidance based regulations and is consulting in two phases on proposals to do so. Phase 1 consultation is complete and Phase 2 is the current consultation.

This draft Regulatory impact Assessment (RIA) outlines the costs and benefits of Parts in the Phase 2 consultation where it is considered there would be an impact on businesses.

As well as this draft RIA, the full package of consultation documents, accessed using the web address [www.buildingregulationsni.gov.uk](http://www.buildingregulationsni.gov.uk) contains the following –

- Dear Consultee letter;
- Consultation Proposals;
- Response Form for Consultees;
- Draft Building Regulations (Northern Ireland) 2011; and
- Technical Booklets for Parts B, D, F, H, J, K, L, P and R.

## **PURPOSE AND INTENDED EFFECT OF MEASURES**

The Department is proposing to consolidate the Building Regulations (Northern Ireland) 2000 and all subsequent amendments, into a new set of Building Regulations which will include an update of the requirements to a number of Parts of the regulations. The regulations will no longer include deemed-to-satisfy provisions; however a new suite of guidance based Technical Booklets will be published in support of the new regulations.

Consultation on the Department's proposals is in two phases. Phase 1 was conducted in 2010. This document, which is part of the Phase 2 proposals, outlines the purpose and intended effect of the Phase 2 proposals.

## **SCOPE**

This draft Regulatory Impact Assessment (RIA) addresses proposals to amend Parts F (Conservation of fuel and power), K (Ventilation), L (Combustion appliances and fuel storage systems) and P (Sanitary appliances and unvented hot water storage systems) of the Building Regulations (Northern Ireland) 2000 (the 2000 Regulations). A number of amendments to Part A (Interpretation and general) are also proposed, many of which are consequential on the changes in the other Parts. The associated Technical Booklets to the above parts propose revised guidance to support alternative ways of meeting the requirements.

In addition, as an outcome of the Phase 1 consultation and other stakeholder engagement, further amendments are being proposed to Technical Booklet E (and as a consequence to Part H).

Parts B (Materials and workmanship), D (Structure), J (Solid Waste and Buildings), N (Drainage) and R (Access to and use of buildings) are not addressed in this RIA as there are no proposals to enhance standards therein. Changes in these Parts are largely to reflect the move to a guidance based approach (see below).

## **OBJECTIVE**

The overall objective of the proposed amendments is to improve the health and safety of people in and around buildings; improve the conservation of fuel and power; further the protection and enhancement of the environment and promote sustainable development, without imposing disproportionate bureaucracy and costs on building owners, developers or on district councils whose role it is to enforce the building regulations

A key objective is that where the Building Regulations and Technical Booklets are updated, the revised standards and technical guidance are amended to ensure that they are generally in technical harmony with requirements which apply elsewhere in the UK.

The proposed amendments will, to varying degrees, affect all of those in the construction industry who are involved in the development, construction or renovation of buildings and those who are tasked with ensuring compliance with the building regulations.

## **CHANGE IN LEGISLATIVE FRAMEWORK TO A GUIDANCE BASED SYSTEM**

The Building Regulations for Northern Ireland apply to most building work. Currently the Department sets mainly functional requirements and gives provisions which, if followed, will satisfy (deemed-to-satisfy) the requirements of the regulations.

The primary legislation – the Building Regulations (Northern Ireland) Order 1979 was amended by the Planning and Building Regulations (Amendment) (Northern Ireland) Order 1990. It was also more recently amended by the Building Regulations (Amendment) Act (Northern Ireland) 2009 (the 2009 Act). This latter amendment gives the Department powers to change the Building Regulations from a deemed-to-satisfy based system to a guidance based system.

In 2011 the Department will be amending the format of the Building Regulations, setting amended requirements for a number of Parts and consolidating all previous amendments into a new set of regulations. Along with the “new” regulations, new Technical Booklets will be published which will replace all the current Technical Booklets and will provide guidance on how the requirements of the regulations may be satisfied.

### **SUMMARY AMENDMENTS PROPOSED**

Details of all amendments proposed for each of the Parts covered by this RIA are at Appendices 1 – 6 attached. In summary these are -

**Part A** - to introduce new provisions for type approvals and to restrict the use of building notices to works to a dwelling of a minor nature that does not increase the floor area by more than 3m<sup>2</sup>. Clarification on the application and interpretation of some existing regulations and defined terms.

**Technical Booklet E** - to remove the alternative design option so that, with respect to the provisions for means of escape, all roofspace conversions in 2 storey houses will be treated in the same way as a new 3 storey house.

**Part F - Regulations** - to set requirements for the conservation of fuel and power in new and renovated buildings and for demonstrating compliance with the requirements.

**Technical Booklets F1 and F2** – to set energy efficiency standards that will achieve on average a 25% reduction in CO<sub>2</sub> emissions over 2006 levels; revised guidance for - minimising thermal bridging at construction joints; inclusion of party wall heat losses in calculation; modular and portable buildings; shell and core developments and first fit-out work; limiting the effects of solar gain in summer; and non-exempt conservatories or porches.

**Part K – Regulations** - to set requirements for the provision of ventilation in new and renovated buildings and for demonstrating compliance with the requirements.

**Technical Booklet K**- guidance included for:- airtight homes; ventilation of basements in dwellings; replacement windows and refurbished kitchens or bathroom (existing dwellings); and evidence of commissioning and information about the ventilation system and its maintenance requirements to be given to the owner/occupier (new dwellings).

**Part L – Regulations** - to set requirements for the provision of detection and warning of the release of carbon monoxide.

**Technical Booklet L** – recognition of solid biofuel as a solid fuel; relaxation of flue clearance requirements for solid biofuel; ventilation for non-room-sealed combustion appliances; and provision of guidance on concealed flues.

**Part P – Regulations** – to set a requirement to ensure that delivered water temperature is not excessive and to limit the temperature of hot water supplied to baths.

**Technical Booklet P** – to provide guidance on how the requirements of Part P may be achieved.

## SUMMARY ANNUAL COMPLIANCE COSTS & BENEFITS

The table below summarises annual costs for all proposed amendments. The benefits cover the life of the building.

	<b>COSTS</b>	<b>BENEFITS</b>	<b>NET BENEFIT</b>
<b>Part F</b>	£40m	} £140m	} £100m
<b>Part K</b>	£4.6m		
<b>Part L</b>	£0.7m	£4.1m	£3.4m
<b>Part P</b>	£0.6m	£2.6m	£2.0m
<b>TOTAL</b>	<b>£45.9</b>	<b>£105.7</b>	<b>£69.0</b>

The proposed amendments to building notices in Part A will realise a cost saving during construction of approximately £0.5 m per annum. The remaining proposals in Part A are considered to be cost neutral.

The proposed amendments to Technical Booklet E are considered to be cost neutral.

**The average cost per dwelling of the proposals is estimated to be £1,025. This consists of £523 for Part F, £410 for Part K, £42 for Part L and £50 for Part P.**

## **BUSINESS SECTORS AFFECTED**

The proposed amendments impose some additional burdens on designers, builders, and developers who will have to meet higher standards. Industry will have to bear the cost of learning the changes brought about by the amended regulations and guidance. They should not require any new skills so it is not anticipated that these costs will be significant. Any increase in time required by Building Control to assess plans, inspect work on site in order to ensure compliance with requirements will be addressed in a review of the Prescribed Fees Regulations.

Demand is likely to fall for products with lower energy efficiency, however, there will be a corresponding rise for products with higher energy efficiency and for Low and Zero Carbon (LZC) products. The policy is likely to promote innovation by suppliers seeking to offer developers low carbon solutions at lower cost.

The Department considers that the proposed amendments would have no significant effect on competition in any markets as they will apply equally. The majority of the changes are intended to introduce guidance in line with current practice, and as such should not significantly alter the current status quo.

Overall, increased capital cost of constructing buildings will mean a larger market for suppliers in total.

## **OTHER IMPACT ASSESSMENTS**

The amendments will apply to all buildings and therefore have an affect on all sectors, businesses, building owners, developers, etc. with no adverse impact on equality of opportunity or the needs of rural customers.

The proposed changes are unlikely to have an adverse effect on the industry, particularly the building materials sector.

## **SMALL FIRMS IMPACT TEST**

A small firms impact test will be carried out.

## **ENFORCEMENT AND SANCTIONS**

The proposals will be enforced by district councils through the existing mechanisms and sanctions provided through the Building Regulations (Northern Ireland) Order 1979 (as amended) (the 1979 Order).

## **MONITORING AND REVIEW**

Amendments to Building Regulations in Northern Ireland are generally made in light of the amendments that have been made in England & Wales, the aim being to maintain technical harmony with the other UK regulatory bodies. In England & Wales the

Department for Communities and Local Government (CLG) undertakes reviews of amendments made to the Building Regulations. The outcomes of these reviews and additional research undertaken by CLG (on behalf of England & Wales, Scotland and Northern Ireland) inform the need for further amendments to Building Regulations.

## **CONSULTATION**

There is a statutory duty to consult the Northern Ireland Building Regulations Advisory Committee (NIBRAC) and such other bodies as appear to the Department to be representative of the interests concerned. NIBRAC has been actively involved in the development of the proposed amendments to the building regulations and has agreed that it is now appropriate to adopt the proposals.

## **ENQUIRIES**

Enquiries and comments regarding this draft Regulatory Impact Assessment should be addressed to Karen McKernon at:

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### **PROPOSED AMENDMENTS TO PART A (INTERPRETATION AND GENERAL)**

#### **BACKGROUND**

- A1. Part A of the Building Regulations establishes processes and procedures relating to the application of the regulations and defines the main terms used in the regulations.
- A2. The outstanding sections of the Building Regulations (Amendment) Act (Northern Ireland) 2009 (the 2009 Act) will be commenced to coincide with the making of the new regulations, introducing a number of new or amended powers and duties for which provision will be made in Part A. In addition to these new provisions, the Department is also proposing a number of changes to the existing provisions.

#### **PROPOSED CHANGES TO PART A**

##### **Type approvals**

- A3. The 2009 Act amended the currently dormant powers within the 1979 Order to permit type approvals, which allow anyone who intends to erect the same house type in a number of district council areas to apply for a “type approval” certificate for that house type which would be valid in those council areas. The Department proposes commencing the amended dormant powers and introducing provisions into the regulations that would establish the process by which such approvals may be granted. It also proposes initially to limit such approvals to dwellinghouses, however the Department will monitor industry feedback to this amendment and may, in the future, if there is a perceived benefit, expand the scope of type approvals to include other building matters such as non-domestic buildings, services and fittings. A type approval will not include site-specific matters such as foundations, carbon emissions and certain fire safety issues.

##### **Building notices**

- A4. Currently, a building notice may be served to notify Building Control of proposed work to an existing dwelling, including alterations and extensions, or for the erection of a new dwelling. Changes to the regulations have meant that a building notice is impractical for the erection of a new dwelling due to the information required at the outset to demonstrate compliance. For example, Building Control is not able to check until the house is near completion whether or not, for example, the requirements of Part F (Conservation of fuel and power) will be satisfied. At this late stage, the developer may face substantial additional costs or find it difficult to comply with the regulations. Without plans, it is also difficult for home owners to determine, in advance of work being undertaken, the cost of an extension or roof space conversion.
- A5. During the initial scoping of this proposed policy, the Department was made aware by district councils that some developers were using a single building notice for

multiple dwellings. Often, this was done to ensure that the application was submitted prior to the coming into operation of new regulations, thereby avoiding the need to meet the revised, and sometimes more onerous, requirements.

- A6. The Department proposes restricting the use of building notices to alterations to a dwelling and to where building work would not increase the dwelling floor area by more than 3m<sup>2</sup>. In addition, it would be emphasised that a separate building notice must be used for each existing dwelling on which building work will be carried out.

### **Exemptions to the giving of notices or deposit of plans**

- A7. The proposed Regulation A9(4) (Giving of notices and deposit of plans) widens the scope of work for which an application is no longer required. It is proposed that applications will no longer be required for -
- external doors;
  - replacement of parts of, or the provision of control or output devices for, fixed building services (such as thermostatic valves);
  - the provision of a self-contained fixed building service, provided certain conditions are met in relation to ease of testing or location; and
  - the provision of fixed internal lighting which serves no more than 100m<sup>2</sup> of an existing building.

### **Other proposed changes to Part A**

- A8. The remaining changes to Part A are to clarify the Department's intent with existing regulations, or to introduce, amend or remove certain definitions applied in the regulations. These changes are seen as cost neutral.

## **RISK ASSESSMENT**

- A9. Part A addresses administrative or interpretative issues, for which there is no perceived risk to health and safety. The proposed changes do not, therefore, increase or decrease any such risk.

## **OPTIONS**

- A10. Two options have been examined:

- Option 1 – do nothing and retain the current provisions; or
- Option 2 – make the proposed amendments to Part A.

## **BENEFITS AND COSTS**

### **OPTION 1- DO NOTHING**

- A11. Option 1 retains the status quo and therefore no direct costs are imposed. However, it does not realise the benefits gained from the second option. It would also impact on proposed changes to the technical requirements of the regulations, as these occasionally also require amendments to Part A.

## **OPTION 2 – MAKE THE PROPOSED CHANGES TO PART A**

- A12. While a fee regime for type approvals has not yet been developed (this will be part of the next phase of consultation which will consider proposed changes to the Building (Prescribed Fees) Regulations (NI) 1997), initial scoping considers that the fee may simply be a percentage of a similar full plans submission, with the remaining percentage being allocated to each council which determines the site-specific matters. Type approvals are provided as an option for the applicant, who may instead elect to submit full plans to each council as they would do currently. For these reasons, the Department considers these provisions to be cost neutral, although in reality the applicant may in fact receive benefits from such an application through reduced costs for the production of plans and the likely reduction in processing time for each use of the approval.
- A13. Currently, the fee for a building notice equates to the sum of the plans fee and inspection fee for a similar dwelling had it been submitted with a full plans application. Following the introduction of the Building (Local Authority Charges) Regulations 2010 in England & Wales, local authorities revised their fees and the building notice fee was often set at a higher level than the equivalent full plans fee to reflect the increased amount of work required by building control. It is likely that a similar increase would be required to the new fee regime in Northern Ireland should building notices remain in their current form.
- A14. The proposed amendment will increase the circumstances in which an applicant must submit full plans for work which previously could be carried out with a building notice. However, the applicant already has to produce plans for planning approval, and therefore some of the cost of producing plans for building regulations purposes may be offset against this existing cost.
- A15. In its publication *“Economic analysis of changes to the Building Control Procedures”*, CLG identified an average saving in England & Wales of £17 million per annum by restricting building notices to minor works and providing project guides. Extrapolating this for Northern Ireland (assuming 3% of overall figure) suggests a benefit of some £510,000 per annum, representing approximately £140,000 saving to the public purse from reduced council staff costs, with savings to the private sector of £370,000 from the reduced administrative burden due to shorter inspection times and the reduced likelihood of having to change building work once it had started.
- A16. The increase in scope of work which does not require an application to building control will result in a cost benefit to applicants from reduced building regulations fees. Development of the new fee regime is underway; however it is not yet at a stage where it would be possible to accurately quantify the cost benefits. Currently, such minor works would attract a fee starting at £60 per application.

## **COMPLIANCE COSTS**

- A17. Compliance costs are as follows –
- Option 1 – maintains the status quo.
  - Option 2 – is the best option given that there may be benefits to the user from reduced processing times, cost and the increase in work for which a building control application is not required.

## **SUMMARY AND RECOMMENDATION**

A18. Option 1 is not valid as it maintains the status quo without the desired outcome.

Option 2 will result in a net saving to applicants, together with a more streamlined approval process for those wishing to avail of type approvals. Until such time as the new fees regime for Northern Ireland has been finalised, it is not possible to quantify accurately this benefit.

A19. On the basis of the assessments presented herein, the Department recommends the adoption of Option 2 – make the proposed changes to Part A.

# PROPOSED AMENDMENT TO TECHNICAL STANDARDS SUPPORTING PART E – FIRE SAFETY

## BACKGROUND

E1 Currently all new-build 3-storey houses should have either two escape routes from the upper storey or be served by a protected stairway. A protected stairway is where all doors leading onto the stairway need to have a certain fire resistance and be fitted with self-closing devices. However, when converting an existing 2-storey house to a 3-storey house by means of a roofspace conversion, the current Technical Booklet gives an option (limited by conditions), different to that required of a new-build 3-storey house.

## PROPOSED CHANGES TO TECHNICAL BOOKLET E

E2 The Department proposes to remove this option so that, with respect to the provisions for means of escape, a roofspace conversion in 2 storey house will be treated in the same way as a new 3 storey house.

## RISK ASSESSMENT

E3 The proposal to remove this option for a roofspace conversion was made to ensure consistency of approach and to assist in reducing the life risk to people should the use of a roofspace conversion change from say, that approved as a storage area, into sleeping accommodation, without providing additional necessary fire safety measures and seeking the necessary building regulations approval.

## OPTIONS

E4 Three options have been examined:-

- Option 1 – do nothing and keep the 2006 standards;
- Option 2 – publicise best practice; and
- Option 3 – amend Technical Booklet E in relation to the provisions for means of escape.

## BENEFITS AND COSTS

### Option 1 – do nothing

E5 Doing nothing maintains the status quo. Although this imposes no direct costs, the benefits realised under Options 2 and 3 would be missed.

### Option 2 – publicise best practice

E6 Option 2 would impose some costs on the public purse to fund efforts to encourage people, in relation to roofspace conversions, to embrace best practice

principles, and produce guidance material to show how this could be achieved. Such costs are difficult to estimate.

### Option 3 – amend Technical Booklet E in relation to the provisions for means of escape

E7 Currently all new-build 3-storey houses should have either two escape routes from the upper storey or be served by a protected stairway. A protected stairway is where all doors leading onto the stairway need to have a certain fire resistance and be fitted with self-closing devices. However, when converting an existing 2-storey house to a 3-storey house by means of a roofspace conversion, the current provisions in Technical Booklet E allow for existing doors onto the stair to be retained, provided they are fitted with self-closing devices and the fire resistance of the floor/ceiling is improved to give ½-hour fire protection. The proposed amendment would mean that the provisions for this option would be removed and therefore, in the vast majority of cases, a protected stair should be provided (although designers may choose to provide an alternative escape route e.g. an external fire escape stair without having to provide a protected stairway).

<b>Table E1: Comparison of costs (based on a typical 3 bedroom semi)</b>		
<b>Cost of existing provisions (to be removed)</b>	<b>Cost of proposed provisions</b>	<b>Cost difference</b>
To increase the fire resistance of a 40m <sup>2</sup> floor/storey area would cost approximately £1,000.  Fitting self-closing devices to existing doors would cost approximately £50	Assuming 5 additional fire resisting doors at £200 per door would cost approximately £1,000	No significant cost difference*

\* The figures show that there may be a small net saving overall, although in some cases the floor area might still require upgrading (at least in part) or more doors might be required depending on the design. It is therefore assumed that this proposal will be cost neutral.

<b>Table E2: Summary of monetary value of benefits</b>		
<b>Cost of existing provisions (to be removed)</b>	<b>Cost of proposed provisions</b>	<b>Cost difference</b>
Remove separate roofspace conversion guidance for means of escape so that roofspace conversions are treated in the same way as a new 3-storey house.	No significant additional costs.	No significant cost difference. Removes confusion, ensures consistency of approach and assists in reducing life risk to people.

## **COMPLIANCE COSTS**

E8 Compliance costs are as follows –

- Option 1 – maintains the status quo.
- Option 2 – would incur publicity costs to the Department but may achieve no benefit.
- Option 3 – is the best option given that there will be no significant additional costs while assisting to achieve the desired outcome of reducing the life risk to people in the circumstances given.

## **SUMMARY AND RECOMMENDATION**

E9 Option 1 - maintains the status quo without the desired outcome.

Option 2 - imposes some costs on the Department.

Option 3 - will bring the guidance supporting Part E in relation to means of escape broadly in line with in England & Wales. This option will also assist in the desired outcome of reducing the life risk to people in the circumstances given.

E10 On this basis the Department's recommendation is Option 3 – amend the technical standards supporting Part E of the Building Regulations (Northern Ireland) 2000.

# PROPOSED AMENDMENTS TO PART F - CONSERVATION OF FUEL & POWER

## BACKGROUND

- F1. A major amendment was made to Part F in 2006, which introduced an improvement of around 44% in terms of reduced emissions on the previous 1999 standards.
- F2. The current deemed-to-satisfy provisions for Part F are given in the following publications –
- Technical Booklet F1: Conservation of fuel and power in dwellings (August 2006) and Technical Booklet F2: Conservation of fuel and power in buildings other than dwellings (August 2006); and
  - The Government's Standard Assessment Procedure for energy rating of dwellings (SAP) 2005 and the National Calculation Methodologies.
- F3. The Government has committed to a move towards low or zero carbon buildings from 2016 for dwellings and from 2019 for buildings other than dwellings. Particular objectives of this proposed amendment as the next step in this progression are to set –
- energy efficiency standards for new dwellings and buildings other than dwellings that will achieve a 25% reduction in CO<sub>2</sub> emissions from buildings relative to the level of emissions that result from the Part F standards introduced in 2006; and
  - tighter standards for energy efficiency in existing buildings.
- F4. The regulations, supporting Technical Booklets F1 and F2, assessment procedures and calculation methodologies are being updated to bring them into line with the changes in England & Wales that came into operation on 1<sup>st</sup> October 2010. As the Department is moving to a guidance based regulatory system the draft Technical Booklets are now written as guidance based publications.

## PROPOSED CHANGES TO TECHNICAL BOOKLET F1 (DWELLINGS)

- F5. For new dwellings, the proposed main changes (additional to para. F3 above) are –
- party wall heat losses now included in SAP 2009;
  - strengthening some of the limiting values for fabric and services;
  - revised guidance for minimising thermal bridging at construction joints, including adopting a quality-assured accredited construction details scheme approach; and
  - guidance on presenting the evidence that demonstrates compliance and highlights the key features that are critical in the dwelling achieving its Target carbon dioxide Emissions Rate (TER).

- F6. For existing dwellings and extensions the proposed main changes (additional to para. F3 above) are –
- a general strengthening of the energy efficiency standards that are considered reasonable for work on thermal elements and controlled fittings and services;
  - revised guidance where an extension is a conservatory or porch that is not exempt; and
  - expansion of guidance for the renovation of a thermal element through the provision of a new layer or through the replacement of an existing layer.

## **PROPOSED CHANGES TO TECHNICAL BOOKLET F2 (BUILDINGS OTHER THAN DWELLINGS)**

- F7. For new buildings the proposed main changes (additional to para. F3 above) are –
- revised guidance on modular and portable buildings;
  - revised guidance on shell and core developments and first fit-out work;
  - revised guidance for demonstrating that reasonable provision has been made to limit the effects of solar gain in summer;
  - revised guidance for minimising thermal bridging at construction joints including adopting a quality-assured accredited construction details scheme approach; and
  - guidance on presenting the evidence that demonstrates compliance and highlights the key features that are critical in the building achieving its TER.
- F8. For existing buildings and extensions the main changes are similar to those for dwellings (para. F6 refers).

## **RISK ASSESSMENT**

- F9. Government intervention is necessary because the damage cost of CO<sub>2</sub> emissions from buildings is not paid for by those constructing or occupying buildings. Without intervention there would most likely be underinvestment in energy saving measures to reduce emissions. Tightening of Part F of the Building Regulations is one means of overcoming this problem by requiring higher energy efficiency levels in new and existing buildings. This forms part of Government's wider policy of substantially lowering net emissions from new buildings (and existing buildings on which work is proposed) later in the decade.

## **OPTIONS**

- F10. Three options have been examined: –
- Option 1 – do nothing and keep the 2006 standards;
  - Option 2 – provide guidance for the existing Part F standards and publicise best practice;
  - Option 3 – amend Part F to bring it into technical harmony with elsewhere in the UK, and provide guidance.

## **BENEFITS AND COSTS**

### **Option 1 – do nothing**

F11. Doing nothing is not a viable option. In order to introduce a guidance based system the Department must convert the Building Regulations and all the Technical Booklets simultaneously. The Department is committed to making this change to provide the flexibility necessary to maintain technical harmony with the building regulations elsewhere in the UK. In addition, failure to make the proposed amendments would result in non-achievement locally of UK Government and EU targets on improving the energy performance of buildings.

### **Option 2 - provide guidance for the existing Part F and publicise best practice**

F12. Do the minimum to convert Part F and Technical Booklets F1 and F2 to a guidance based system. This would mean that there would be no technical update of the provisions in the 2006 Technical Booklets F1 and F2. This would not achieve the Department's general objective of maintaining technical harmony between the building regulations in Northern Ireland and those elsewhere in the UK, particularly in England & Wales. It may also not help to achieve the UK and EU targets.

### **Option 3 – amend Part F to harmonise with UK regions and provide guidance**

F13. Amend Part F requirements and provide guidance in the Technical Booklets on demonstrating compliance with the requirements of the regulations.

F14. This option will –

- achieve a 25% reduction in CO<sub>2</sub> emissions from new buildings relative to Part F standards introduced in 2006;
- set tighter standards for energy efficiency in existing buildings;
- bring Part F generally into technical harmony with the requirements elsewhere in the UK; and
- provide demonstrable evidence of Northern Ireland's commitment to contribute, through the Building Regulations, to delivering UK and EU targets.

F15. In July 2007, the Government's *Building a Greener Future: Towards Zero Carbon Development* announced that all new homes in England & Wales should emit zero net carbon<sup>1</sup> from 2016 with a progressive tightening of the Building Regulations in 2010 and 2013. Similar ambitions for new buildings other than dwellings were made in the *Budget Report 2008*. The ambition for these buildings is to set net zero carbon standards from 2018 for new public sector buildings and from 2019 for other new buildings other than dwellings. In addition to this, the Government is

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<sup>1</sup> recommendations have been made to the Westminster Government by its advisory body, the Zero Carbon Hub, that affordable standards in the Building Regulations from 2016 for dwellings would be between 45 and 60% improvement on 2006 standards. A system of "Allowable solutions" outside of Building Regulations will be developed in relation to remaining emissions.

seeking to improve the energy efficiency standards that apply when building works are carried out on existing buildings.

- F16. An important aspect of the policy is that the additional costs of construction would fall primarily upon developers, whilst the benefits are gained by occupants through lower energy bills or by society as a whole in the form of carbon savings.

## Dwellings

- F17. Research shows that where party walls between connected buildings are untreated, considerable heat can escape through them. The proposed amendment requires the party wall heat loss to be tackled before starting to count the 25% improvements. Credits for 100% low energy lighting and only counting secondary heating when actually installed, are included within the 25% improvement.
- F18. UK specifications were identified using SAP that would result in a 25% reduction in CO<sub>2</sub> emissions for each dwelling type. These are set out in Table F1. Developers are not tied to these specifications because SAP allows a trade off between the various elements to achieve the Target carbon dioxide Emissions Rate (TER).

<b>Table F1: Dwellings specifications</b>				
	<b>Detached</b>	<b>Semi detached</b>	<b>Mid terrace</b>	<b>Electric flat</b>
Roof (U-value)	0.18	0.18	0.19	0.16
Walls (U-value)	0.23	0.24	0.23	0.18
Party walls (U-value)	N/A	0.00	0.00	0.00
Floor (U-value)	0.21	0.21	0.21	0.19
Windows and doors (U-value)	1.7	1.7	1.6	1.3
Boilers (seasonal efficiency)	90%	90%	90%	N/A
Electric heat emitters (seasonal efficiency)	N/A	N/A	N/A	100%
Secondary heating	None	None	None	N/A
Air permeability {m <sup>3</sup> /(h.m <sup>2</sup> )}	5	5	5	5
Thermal bridging (y)	0.04	0.04	0.04	0.04
Hot water cylinder insulation (mm)	100	100	100	100
Ventilation system	Natural	Natural	Natural	Natural
Lighting – CFLs	100%	100%	100%	100%

Developed from Table 3 of the England & Wales RIA

- F19. Some of the building services (Table F1) are pushed harder than the fabric measures because there are large electricity savings that can be achieved cost effectively. The option of using low and zero carbon technologies was included in the E&W modelling but energy efficiency measures were cheaper.

## Buildings other than dwellings

F20. An 'Aggregate 25%' (the estimated average saving over all buildings other than dwellings) approach has been adopted by England & Wales for buildings other than dwellings. With this approach different targets are set for each building category according to the cost effectiveness of achieving emissions savings in each category.

F21. Two target setting specifications are proposed and these are set out in Table F2.

<b>Table F2: Specifications for 'Aggregate 25%' approach in buildings other than dwellings</b>		
	<b>"Roof-lit"</b>	<b>"Side-lit"</b>
Roofs (U-value)	0.18	0.18
Walls (U-value)	0.26	0.26
Floors (U-value)	0.22	0.22
Windows, doors and rooflights (U-value)	1.8	1.8
Air permeability	5	5
Lighting (lm/W)	55	55
Multiburner radiant system (thermal/radiant efficiency)	86%/65%	–
Central mechanical ventilation (SFP)	1.8	1.8
Fan coil units (SFP)	–	0.5
Boilers (seasonal efficiency)	90%	88%
Cooling (SEER)*	4.5	4.5
DX Cooling (SEER)*	–	3.5

Developed from Table 6 of the England & Wales RIA

\* The energy benefits for cooling are based on Seasonal Energy Efficiency Ratios (SEERs), whereas the costs are based on Energy Efficiency Ratios (EERs).

F22. Under the 'Aggregate 25%' approach different building types would contribute different CO<sub>2</sub> reductions in order to meet the overall 25% annual reduction. The level of emissions reduction expected from each building type is dependent on the cost of achieving those reductions. If the cost of achieving further reductions is high, as it is for hotels and retail units, then reduction of less than the average level of 25% would be required. This is offset by higher percentage reductions from other building types such as warehouses and shallow plan offices, where the costs of achieving the additional savings are lower. Based on the specifications above, each building type would need to achieve the percentage reductions in CO<sub>2</sub> emissions shown in Table F3.

<b>Table F3: Percentage CO<sub>2</sub> reductions by building type</b>							
<b>Shallow plan office (heated)</b>	<b>Shallow plan office (Aircon)</b>	<b>Deep plan office (Aircon)</b>	<b>Ware-house</b>	<b>Hotel</b>	<b>School</b>	<b>Retail</b>	<b>Super-market</b>
22%	40%	26%	34%	16%	27%	21%	26%

Developed from Table 7 of the England & Wales RIA

F23. The target reductions above are based on a combination of the build mix and the energy intensity of the buildings modelled. Based on the build mix alone, the percentages above would yield an overall improvement greater than 25%; however, when the energy intensity of these buildings is taken into account the overall improvement is 25%. In particular, the higher than average energy intensity of a retail unit in use (and to a lesser extent the hotel) counters the much higher build rate for the warehouse, as the warehouse has a much lower energy intensity.

### **Construction Costs**

F24. The proposals will increase the costs of constructing new buildings, as property developers will need to invest to a greater extent in energy efficient building fabric and services in order to comply with the lower limit on carbon emissions. The fabric and service elements which contribute to improving energy efficiency can account for a relatively small proportion of the total building cost. For the purpose of this analysis, it is assumed that other costs e.g. structural components and labour costs, are not changed by the policy. The estimated cost impact varies across different types of property in both the dwellings and buildings other than dwellings sectors. The estimated impact on capital cost for different types of building is shown in Table F4.

F25. For dwellings, the (upfront) incremental capital cost increase varies between building types but all increases are relatively small.

F26. For buildings other than dwellings, the capital cost increase is quite varied across building types. This is not surprising, given that not all buildings will achieve a 25% reduction in annual CO<sub>2</sub> emissions in the 'Aggregate 25%' approach – some will achieve more while others will achieve less.

F27. It is worth noting that the costs in Table F4 are based on specific sizes of buildings, so for example, a larger retail unit would not necessarily see the same increase in capital costs compared to a 2006 compliant building.

F28. Although developers will incur these costs in the first instance, it is probable that they will be passed on to purchasers or renters of property. As land development costs have reduced significantly from their peak in 2008, the overall development costs of building will still be lower than peak prices.

<b>Table F4: Estimated impact on capital costs for some typical properties</b>			
		<b>Additional capital cost</b>	
	<b>Assumed cost of a 2006-compliant building (£)</b>	<b>£</b>	<b>Percentage increase in cost</b>
<b>Dwellings ('Flat 25%')</b>			
Oil-heated detached house	93,167	526	0.6%
Oil-heated semi-detached house	93,268	547	0.6%
Oil-heated terraced house	86,388	600	0.7%
Electric-heated flat	60,813	1,050	1.7%
<b>Buildings other than dwellings ('Aggregate 25%')</b>			
Shallow plan office (heated)	3,098,086	40,662	1.3%
Shallow plan office (air conditioned)	3,162,610	90,723	2.9%
Deep plan office (air conditioned)	26,531,913	294,635	1.1%
Warehouse	1,745,002	3,245	0.2%
Hotel	1,848,347	8,063	0.4%
School	1,990,313	13,185	0.7%
Retail	853,309	7,522	0.9%
Supermarket	347,682	9,084	2.6%

Developed from Table 19 of the England & Wales RIA – these have not been adjusted for Northern Ireland building costs because it is the relative percentage increases that are of interest.

### **Purchasers and occupiers of property**

- F29. Purchasers of properties may bear some of the increase in capital costs if buildings with lower carbon emissions command a premium in the property market. The introduction of Energy Performance Certificates (EPCs) may facilitate the emergence of such a premium, by providing information to buyers and raising awareness of energy performance issues.
- F30. The occupier of a property will sometimes be the purchaser (e.g. owner-occupied homes). In the rental sector, however, the occupier and the purchaser will be different. The extent to which any purchase premium for lower carbon properties is passed on to tenants will depend on pricing trends in the rental market. The

availability of EPCs will identify energy efficient properties which may attract a rental premium.

- F31. The occupiers of properties built to the new standards should benefit from lower energy bills. Table F5 below presents estimated savings in annual oil and electricity bills for some typical properties.

<b>Table F5: Estimated annual energy bill savings for some typical properties</b>			
	<b>Saving on oil bill (£)</b>	<b>Saving on electricity bill (£)</b>	<b>Total saving</b>
<b>Dwellings ('Flat 25%')</b>			
Oil-heated detached house	51	128	179
Oil-heated semi-detached house	77	104	181
Oil-heated terraced house	84	92	176
Electric-heated flat	N/A	141	141
<b>Buildings other than dwellings ('Aggregate 25%')</b>			
Shallow plan office (heated)	533	2,509	3,042
Shallow plan office (air conditioned)	592	11,473	12,065
Deep plan office (air conditioned)	3,362	36,873	40,235
Warehouse	918	1,580	2,498
Hotel	-111	6,460	6,349
School	517	3,261	3,778
Retail	98	463	561
Supermarket	0	1,355	1,355

NB – the above figures were taken from Table 20 of the England & Wales RIA and adjusted to reflect the predominance of oil based heating in NI. These were based on fuel costs at January 2009 of 36p per litre for heating oil and 15p per kWh for electricity (source: Department of Energy and Climate Change). DECC has advised that between January 2009 and January 2011, fuel costs have risen by approximately 53% to 55p per litre for heating oil, therefore the projected savings on oil should be increased by a similar factor, resulting in a shorter pay-back period.

- F32. The impact on fuel bills is reasonably consistent across different types of dwellings, with a range of savings of £141 to £181 per annum. The larger the dwelling, the greater is the annual fuel bill saving.
- F33. There is a considerable variation in savings in energy bills across buildings other than dwellings. The % saving would be related to the %CO<sub>2</sub> reduction for the building type shown in Table F3.
- F34. The policy will affect Building Control which will be responsible for enforcing compliance with the standards. District councils will need to ensure their staff are familiar with the new policy (e.g. through the provision of training).

### **Summary costs and benefits**

- F35. The estimates of benefits and costs given in Table F6 have been calculated from the figures given in the RIA for the equivalent amendment of the Building Regulations in England & Wales. All the costs and benefits have been adjusted by a scaling factor of 0.032 which is the ratio of the population in England & Wales to that in Northern Ireland. This figure has been used by the Department of Enterprise, Trade and Investment (DETI) when making similar calculations.

- F36. At the time of writing this RIA, DETI advised the Department that Phoenix Supply natural gas prices for domestic consumers in Greater Belfast were around 10% cheaper than average GB gas prices and that NIE Energy domestic electricity prices were around 11% higher than average GB electricity prices. On average, heating oil prices in Northern Ireland tend to fluctuate around the price of gas.
- F37. Overall there appears to be little difference currently in building energy costs between Northern Ireland and GB so the figures for energy savings in Table F6 below have not been adjusted from the figures in Table 18 of the England & Wales RIA.

<b>Table F6: Present value of costs and benefits in Northern Ireland (£m net present value)</b>						
	<b>10 year's additional building costs</b>	<b>Savings over 60 year period resulting from 10 year's of building</b>				
		<b>Energy savings</b>	<b>CO<sub>2</sub> savings (oil heating)</b>	<b>Avoided renewables<sup>2</sup></b>	<b>Total benefits</b>	<b>Total net benefits</b>
New domestic	16	84	58	1	143	127
Existing domestic	218	471	313	10	794	576
New non-domestic buildings	61	116	67	1	184	123
Existing non-domestic buildings	110	209	67	1	277	167
Totals	405	880	506	12	1,398	993
Annual cost	40.5	88	50.6	1.2	139.8	99.3

Calculated from Table 18 of the England & Wales RIA

- F38. The values (relative to the 2006 baseline or 'Do Nothing' option) were calculated using the projected new build rates over a ten year period (2012-2021). Buildings were assumed to have a 60 year life with replacement of shorter life assets during that period. A discount rate of 3.5% was used for the first 30 years and 3% thereafter. The total net present value benefit of moving from the 2006 to the 2011 Building Regulations was calculated by subtracting the building costs from the sum of the present values of energy savings, CO<sub>2</sub> savings and avoided renewables.
- F39. Details of how these figures were calculated are given in the England & Wales RIA which is available at – <http://www.communities.gov.uk/publications/planningandbuilding/part1f2010ia>
- F40. The figures show a substantial net benefit over sixty years. Even before CO<sub>2</sub> savings are taken into account, the energy savings outweigh the building costs.

<sup>2</sup> Policies which reduce final energy consumption reduce the amount of renewables which the UK has to build to meet its 2020 target under the EU Renewables Directive – hence the figure for 'avoided renewables'.

## **COMPLIANCE COSTS**

- F41. Option 1 - is not viable.
- F42. Option 2 - would incur publicity costs to the Department but may achieve no benefit.
- F43. Option 3 – it is estimated that the additional building costs in Northern Ireland resulting from this amendment will be approximately £40m per annum.

## **OTHER COSTS**

- F44. In addition to the higher capital costs of constructing new buildings, developers will have to become familiar with the revised standards; they may also incur additional administrative costs associated with the proposed Accredited Construction Details (ACD) scheme(s) (should they decide to use this option); and an increased sample size for air pressure testing.
- F45. No account has been taken of the effects of increased costs on the demand for new buildings or on the supply of land for development.
- F46. There should be no environmental costs.

## **SUMMARY AND RECOMMENDATION**

- F47. Option 1 is not viable because the regulations and Technical Booklet need to be converted to a guidance based system.
- F48. Option 2 provides no long term benefits. The Regulations and Technical Booklets F1 and F2 would not be in technical harmony with the requirements and guidance elsewhere in the UK.
- F49. Option 3 would provide up-to-date regulations and guidance in technical harmony with building regulations elsewhere in the UK and would ensure more energy efficient buildings are constructed. This would also reduce the amount of carbon being emitted, contributing to achieving Government targets for zero carbon buildings.
- F50. On the basis of the assessments presented in this paper, the Department's recommendation is Option 3 – to amend Part F of the Building Regulations (Northern Ireland) 2000 and to provide the updated guidance in a new Technical Booklets F1 and F2.

# PROPOSED AMENDMENTS TO PART K – VENTILATION

## BACKGROUND

- K1. The requirements and the Technical Booklet for Part K (Ventilation) were last reviewed in 1998. Since then there have been developments in building practice which make it necessary to upgrade the provisions relating to ventilation. The provisions in the current Technical Booklet are either lagging behind current good practice or do not address recent guidance.
- K2. In updating the provisions for Ventilation consideration has also been given to the changes to Part F (Conservation of fuel and power), to ensure that health standards are not undermined by the potential increase in air tightness of buildings, which could lead to the deterioration of indoor air quality with potentially negative consequences on building fabric, structure, and human health.

## PROPOSED CHANGES

- K3. The proposed changes that are considered significant are -
- the guidance shows methods to achieve the performance standards and lists alternative ventilation strategies that can be used;
  - all ventilation systems (both natural and mechanical) must, where practicable, be inspected and commissioned;
  - evidence that commissioning and testing have been carried out for new dwellings has to be given to building control;
  - the owner/occupier of a new dwelling must be given sufficient information about the ventilation system and its maintenance requirements so that the ventilation system can be operated to provide adequate air flow;
  - ventilation 'areas' are described in terms of 'equivalent area';
  - the infiltration allowance for leakier homes is the same for single-storey and multi-storey dwellings, resulting in increased ventilation provisions for single-storey dwellings up to four storeys above the ground;
  - guidance is provided in relation to ventilation for: -
    - airtight homes; (dwellings with design air permeability tighter than or equal to  $5 \text{ m}^3/(\text{h.m}^2)$  at 50 Pa.);
    - basements in dwellings;
    - windows which are replaced in an existing dwelling;
    - when a kitchen or bathroom is refurbished in an existing dwelling; and
    - the installation and commissioning of domestic ventilation systems (a separate CLG guidance document); and
  - appendices will give guidance on performance-based ventilation; rapid ventilation design; example calculations for each ventilation system; and minimising ingress of external pollutants into buildings in urban areas.

- K4. A number of other proposed amendments are very minor and are considered to be cost neutral.

## **RISK ASSESSMENT**

- K5. Regulation K2 is concerned with the provision of adequate ventilation for people in buildings. Inadequate ventilation in buildings can lead to high levels of moisture (produced by cooking, washing/drying and breathing) and other harmful indoor pollutants (produced by combustion appliances, smoking, painting, etc.) which in turn can affect health.
- K6. Condensation and dampness in buildings can cause mould growth. Mould spores may contribute to human respiratory problems. Moisture can also be harmful to the fabric of buildings and damage structural integrity as well as surface finishes.
- K7. Specifically, the hazards related to inadequate ventilation are: -
- hygrothermal conditions;
  - fungal growth;
  - house dust mites;
  - gaseous combustion products, e.g. carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>);
  - tobacco smoke;
  - volatile organic compounds (VOCs); and
  - radon, landfill gas and other hazardous soil gases.
- K8. However, Part K does not deal exclusively with all of these hazards as a number of them are addressed by other Parts of the Building Regulations. For example, the provision of adequate ventilation to control the emission of gaseous products from combustion appliances (such as boilers) is dealt with by Part L (Combustion appliances and fuel storage systems); and Part C (Preparation of site and resistance to moisture) deals within the provision of adequate ventilation to control emissions of radon, landfill gas and other hazardous gases from the ground. (However, where there is a sudden and significant increase in these or any other indoor pollutant which needs to be dispersed by rapid ventilation then this does fall within the remit of Part K). Lastly, the energy performance requirements of Part F also have a considerable impact on a building's hygrothermal conditions. Ventilation has a role in determining thermal comfort and the control of summer overheating but this is outside of the terms of reference of Part K and is specifically addressed by Part F.

## **OPTIONS**

- K9. Three options have been examined:-
- Option 1 – do nothing;
  - Option 2 – provide guidance for the existing Part K and publicise best practice; and
  - Option 3 – amend Part K to bring it generally into technical harmony with elsewhere in the UK and provide guidance.

## **BENEFITS AND COSTS**

### **Option 1 – do nothing**

K10. Doing nothing is not a viable option. In order to introduce a guidance based system the Department must convert the Building Regulations and all the Technical Booklets simultaneously. The Department is committed to making this change in 2011 to provide the flexibility necessary to maintain technical harmony with the building regulations elsewhere in the UK. In addition, if the amendments proposed for Part F (Conservation of fuel and power) proceed, it would be necessary to make the proposed revisions to Part L to avoid the hazards identified in paras. K6 & K7.

### **Option 2 – provide guidance for existing Part K and promote best practice**

K11. Do the minimum to convert Part K and Technical Booklet K to a guidance based system and to publicise good practice.

K12. This option would mean that there would be -

- no technical update of the provisions in the 1998 Technical Booklet K;
- no amendment to the references to superseded third party documents; and
- guidance on ventilation would be out of date, would lag behind, and would be in conflict with Part F requirements.

K13. A large part of industry already operates to good practice. Experience has shown that undertaking a publicity campaign alone to highlight good practice to those in the industry who are not following such practices is unlikely to have a significant long-lasting effect.

K14. The cost to the Department of a publicity campaign is hard to quantify and is dependent on what form this would take.

K15. A publicity campaign would not achieve the Department's general objective of maintaining technical harmony between the building regulations in Northern Ireland and those elsewhere in the UK and in particular in England and Wales.

K16. The benefit in adopting Option 2 is that it would facilitate the transition of the Building Regulations to a guidance based system. However, this option would leave the technical requirements unchanged and it would ignore the considerable body of policy and technical guidance that has been produced over the last twelve years.

### **Option 3 – amend Part K to harmonise with elsewhere in the UK and provide guidance**

K17. Amend Part K regulations, the supporting technical provisions in Technical Booklet K and provide guidance in Technical Booklet K on demonstrating compliance with the requirements of the regulations.

- K18. This option will bring Part K up-to-date and generally into technical harmony with requirements operating elsewhere in the UK.
- K19. One of the effects of the continued tightening of Part F requirements is that buildings are being constructed with greater levels of air tightness. Consequential changes are needed in Part K to ensure that the improved levels of air tightness do not result in reduced indoor air quality with an adverse impact on health. As these changes are largely driven by the changes to Part F their impact should be assessed together with the appraisal of Part F.
- K20. In the non-domestic sector, the required ventilation rates do not assume any air leakage in the building, therefore these ventilation rates should continue to be sufficient even as air permeability requirements tighten.
- K21. However, greater air tightness in the domestic sector does raise possible ventilation issues. Recent UK surveys have indicated that a growing number of new dwellings are being built with levels of air permeability much better than the existing Technical Booklet K was designed for, and this trend is likely to continue as Part F requirements are tightened even further. Existing Part K ventilation rates are inadequate for such dwellings, and if action is not taken this situation will lead to the deterioration of indoor air quality with potentially negative consequences for human health. The key health concern addressed by the ventilation provisions of Part K is the effect of indoor pollutants on respiratory illnesses, particularly asthma.

## **AMENDMENTS WITH A COST IMPACT**

- K22. For dwellings, the costs associated with amending Part K are summarised in Table K1. The housing figures quoted are taken from Housing Statistics records for NI for 2004/5 to 2009/10 and averaged. The estimates of benefits and costs have been calculated from the figures given in the RIA for the Part F (Ventilation) amendment of the Building Regulations in England & Wales. All the costs and benefits have been adjusted by a scaling factor of 0.032 which is the ratio of the population in England & Wales to that in Northern Ireland. This figure has been used by the Department of Enterprise, Trade and Investment when making similar calculations
- K23. The draft Technical Booklet K for 2011 contains higher purpose-provided ventilation rates for more air tight dwellings (those with a design air permeability of equal to or better than  $5 \text{ m}^3/(\text{h.m}^2)$  at 50 Pa). It has been assumed, based on industry discussions, that there could be a 15% increase in the installation of continuous mechanical ventilation, either Mechanical Extract (MEV) or Mechanical Supply and Extract with Heat Recovery (MVHR) systems as a result of this proposal. It is estimated that this could result in an additional annual cost to industry of around £0.30 m.
- K24. It is also a requirement that air flow rates should be measured in all new dwellings and that the measured flow rates would be given to Building Control. There would be an additional cost associated with this measurement. Based on individual test costs of £125 for MVHR; £90 for MEV and £60 for intermittent extraction (assumed average £100) it is estimated that the annual cost would be just under £1.3 m.

**Table K1 – Costings for proposed amendments**

	<b>Average no. of dwelling completions per annum<sup>(1)</sup></b>	<b>Average no. of occurrences per annum<sup>(1)</sup></b>	<b>Estimated cost per dwelling (supply &amp; installation)</b>	<b>Estimated Total Cost</b>
Installation of continuously running fans - estimated 15% increase on existing <sup>(2)</sup>	12954	1942	£150	£291,300
Measurement of Air Flow rates <sup>(2)</sup>	12954	12954	£100	£1,295,400
Increased size required for Trickle Ventilators due to greater ventilation needed due to more airtight buildings - average 7 per house @ £10 each (inc. 2 in habitable & 1 in wet rooms) <sup>(2)</sup>	12954	90,678	£70	£906,780
Increased size/number of window openings due to using 'equivalent area' opening instead of 'free area' and 30 & 15 deg opening measure.	13986	13986	£40	£559,440
Cost of providing Commissioning Certificate for Building Control (including social housing)	13986	13986	£75	£1,048,950
Cost of providing Operation Manual for occupant/owner <sup>(2)</sup>	12954	12954	£50	£647,700
		<b>Total</b>	<b>£485<sup>(4)</sup></b>	<b>£4,749,570</b>
Reduction in respiratory health issues such as asthma saving costs on hospitalisation and possibly death.	N/A	N/A	N/A	-160,000 <sup>(3)</sup>

**Note:**

<sup>(1)</sup> On 6 year period 200/05 – 2009/10

<sup>(2)</sup> Assuming Social Housing (average 1032 completed dwellings p.a.) already meets this requirement.

<sup>(3)</sup> See paragraph K 32.

<sup>(4)</sup> Average cost per dwelling assuming the 15% worst case scenario (£150) for installation of continuously running fans; this reduces to £335 in best case scenario (£0 for installing such fans) giving an overall average of £410 per dwelling )

<b>Total</b>	<b>£4,733,570</b>
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K25. Higher ventilation rates will require natural ventilation openings, such as trickle ventilators, to be either increased in size or number from what they currently are, resulting in an additional annual cost of around £0.90m. The requirement to use 'equivalent' area as opposed to 'free' area in working out the natural ventilation opening for rapid ventilation (opening window size) will result in an additional annual cost of approximately £0.56m.

K26. There is also a new requirement for ventilation systems, in new and existing buildings, to be inspected and commissioned (there is already a requirement under Part F for installation and commissioning to ensure the systems are energy

efficient). The Domestic Ventilation: Installation and Commissioning Compliance Guide provides details of how this new requirement may be met for dwellings. We have estimated that there would be an additional annual cost of around £1.0 m for this installation and commissioning procedure.

- K27. There would also be a requirement that sufficient information on the ventilation system be given to the owner/occupier for all new dwellings to allow it to be operated to provide adequate ventilation at an annual cost of £0.65 m.
- K28. The changes to Part K are largely consequential on the changes required under Part F. The net benefit of the Part F proposals for new dwellings is substantial and well in excess of the additional Part K costs identified above.

## **AMENDMENTS WITH LITTLE OR NO COST IMPACT**

- K29. Much of the guidance is normal good practice and as such it should have no cost implications.
- K30. There are non-tangible benefits from adopting this option, such as greater confidence or peace of mind knowing that such issues as building fabric deterioration and health risks due to better air quality are reduced.
- K31. Increasing the ventilation levels will reduce the risk of dampness in the building and avoid the possible consequential respiratory health problems associated with mould growth and lingering pollutants.
- K32. Using the E & W Willingness-To-Pay (WTP) calculations for 'lives saved converted into a monetary value', it is estimated that this could reduce healthcare costs by about £0.16 million per year by reducing respiratory health issues such as asthma saving costs on hospitalization and possibly death (see Table 1).

## **COMPLIANCE COSTS**

- K33. Option 1 is not viable.
- K34. Option 2 generates no benefits, and would incur costs in terms of publicizing the guidance with no guarantee of long term benefit nor adherence to guidance.
- K35. Option 3 - the changes to Part K are largely consequential on the changes required under Part F and as the net benefit of the Part F proposals for new dwellings is substantial and well in excess of the additional Part K costs identified here together they make this a viable option.

## **SUMMARY AND RECOMMENDATION**

- K36. Option 1 is not viable because the regulations and Technical Booklet need to be converted to a guidance based system.
- K37. Option 2 imposes some costs on Government, but provides no long term benefits. The Regulations and Technical Booklet K would remain out-dated and not in technical harmony with the requirements and guidance elsewhere in the UK.

- K38. Option 3 would provide up-to-date regulations and guidance broadly in technical harmony with building regulations in the UK.
- K39. The changes to Part K are largely consequential on the changes required under Part F and the net benefit of the Part F proposals for new dwellings is substantial and well in excess of the additional Part K costs identified above.
- K40. On the basis of the assessments presented in this paper, the Department's recommendation is Option 3 – to amend Part K of the Building Regulations (Northern Ireland) 2000 and to provide the updated guidance in a new Technical Booklet K.

# PROPOSED AMENDMENTS TO PART L – COMBUSTION APPLIANCES & FUEL STORAGE SYSTEMS

## BACKGROUND

L1. Part L (Combustion appliances and fuel storage systems) requirements were last amended in 2006. Since then there have been a number of changes to the equivalent requirements elsewhere in the UK. Also following a review, the Department is proposing to make installation of carbon monoxide (CO) alarms compulsory in all new dwellings and in existing dwellings when a combustion appliance is installed or replaced. This proposal would not apply to combustion appliances designed solely for cooking.

## PROPOSED CHANGES

L2. The proposed changes that are considered significant are -

- visual recognition of solid biofuel as a solid fuel;
- clarification of flue requirements for solid biofuel;
- clarification of clearance requirements for solid biofuel (to prevent accidental ignition of adjacent materials);
- incorporation of guidance for concealed (horizontal) flues;
- provision of a method for the detection and warning of release of carbon monoxide where a combustion appliance is being installed or replaced in a dwelling; and
- provision of dedicated ventilation for non-room-sealed combustion appliances.

## RISK ASSESSMENT

L3. The proposed changes recognise the fact that solid biofuel combustion appliances are now more common, produce less ash and soot than other appliances and give designers/installers the choice of using a less onerous flue size. They address concealed flues to ensure a means of access to inspect is provided, so reducing the potential for the flue to leak poisonous CO gas. They require the installation of a CO detector in new dwellings and where new or replacement combustion appliances are installed, to help prevent death or injury from CO poisoning. Finally they require measures to ensure that, in recognition of enhanced air-tightness standards required by Part F, open-flue and flueless combustion appliances installed in new or existing dwellings have sufficient air flow to ensure the safe operation of the appliance, again to help prevent death or injury from CO poisoning.

## OPTIONS

L4. Three options have been examined:-

Option 1 – do nothing;

Option 2 – provide guidance for the existing Part L and publicise best

practice; and

Option 3 – Amend Part L to harmonise with England & Wales and to ensure that where any combustion appliance is installed or replaced in a dwelling a CO alarm is also provided and provide guidance.

## **BENEFITS AND COSTS**

### **Option 1 – do nothing**

L5. Doing nothing is not a viable option. In order to introduce a guidance based system the Department must convert the Building Regulations and all the Technical Booklets simultaneously. The Department is committed to making this change in 2011 to provide the flexibility necessary to maintain technical harmony with the building regulations in England & Wales. Without change, the guidance would remain unclear regarding the status of solid biofuels and there could be substantial costs involved with any deaths or injuries as a result of the release of CO. This option provides no benefits.

### **Option 2 – provide guidance for existing Part L and publicise best practice**

L6. This option would involve doing the minimum to convert Part L and Technical Booklet L to a guidance-based system and to publicise good practice. This would mean there would be no technical uplift to align with modern appliance requirements and none of the associated benefits in terms of reducing the potential for death and injuries from CO poisoning or relaxing requirements relating to new biofuel installations.

### **Option 3 – amend Part L to harmonise with England & Wales and to ensure that where any combustion appliance is installed or replaced in a dwelling a CO alarm is also provided, and provide guidance**

#### **Recognise solid biofuel as a solid fuel**

L7. There are no cost implications in simply giving recognition in the guidance to solid biofuel given the increased popularity of such fuels. Specific reference to solid biofuel in the Technical Booklet would provide clarification and could help to promote the use of greener fuels.

#### **Relaxation of flue and clearance requirements for solid biofuel**

L8. Some modern biofuel appliances produce less ash and soot than other solid fuel appliances and the probability of the flue becoming blocked is reduced compared with less sophisticated appliances. The current minimum flue diameter of 125mm for standard appliances would be reduced to 100mm for modern biofuel appliances if permitted by the appliance manufacturer and supported by calculation.

L9. Calculation methods for the sizing of flues can be very time consuming and in some cases costs involved in calculating the flue diameter may be greater than

the costs saved from using a smaller diameter flue. A designer/installer is free to choose between a standard flue diameter or that permitted by the appliance manufacturer (supported by calculation). Assuming the designer/installer will choose the least costly option (in terms of effort and financial cost), the impact of the amendment may be considered to be cost-neutral. Therefore, for the purposes of aggregating the costs and benefits of this revision of Technical Booklet L, the benefit is assumed to equal the costs (nil).

- L10. Some modern biofuel appliances are designed such that they do not require a hearth or additional wall protection to prevent accidental ignition of adjacent materials. However, the existing Technical Booklet L treats all solid fuel in the same way. It is proposed that Technical Booklet L is amended such that, whilst still treating solid biofuel broadly as a solid fuel, it provides greater flexibility in the guidance where measures necessary for conventional solid fuel appliances are unnecessary for the more sophisticated biofuel appliances.
- L11. The impact of the increased flexibility offered by this proposal is considered to give rise to no additional cost and has the potential to provide benefits in terms of reduced costs (e.g. unnecessary hearths) and home design flexibility. It is also intended to reduce the perceived barriers to the use of solid biofuel appliances and therefore would be beneficial in terms of reducing carbon emissions.
- L12. For the purposes of aggregating the costs and benefits of this revision of Technical Booklet L, as the up-side of the potential cost savings and flexibility benefits are not monetised, the benefit is assumed to equal the costs (nil).

### **Incorporation of the provision of detection and warning of the release of carbon monoxide (CO) & concealed flue guidance**

- L13. CO is a colourless, odourless, poisonous gas produced by the incomplete burning of carbon based fuels, including gas, oil, wood or coal. When the fuel does not burn properly, excess CO is produced. When CO enters the body, it prevents the blood from bringing oxygen to cells, tissues and organs which can ultimately lead to death. Young children and elderly people are particularly at risk from CO poisoning because their bodies are less able to withstand its effects.
- L14. A modern fanned draft boiler is suitable for operation with a significant length of horizontal flue which may run through a ceiling void. However, whilst a fanned draft boiler can operate safely in these circumstances (as designed and tested for), it can be difficult or impossible to inspect the flue for integrity, leakage or corrosion and to carry out safety checks (as required by other legislation) unless suitable provision is made for access into the void. Where access to a concealed flue is not provided there is a risk that the flue may leak poisonous CO gas into the dwelling or adjoining dwellings if it has not been installed properly or has fallen into disrepair without anyone noticing. It is this problem that the new guidance aims to address. Gas industry practice, first published in CORGI Technical Bulletin 200, includes specific mention of the need to install a means of access to the flue at strategic locations to allow for visual inspection.
- L15. In a properly functioning appliance the products of combustion, including CO, are discharged through the chimney and diluted in the atmosphere to non-hazardous levels. A build-up of CO in the heated space can occur due to a number of

reasons: the appliance being faulty, misused, poorly installed or maintained; the flue being blocked and/or leaky; or inadequate ventilation in the room space.

- L16. In November 2008, the DHSSPS Chief Medical Officer, in awareness raising information to medical professionals, identified that in NI between 2003 and 2007 there was an average of 2 deaths per year, with hospital admissions (serious injury) averaging 8 per year (minor injuries are assumed at 4 times the rate of serious injuries).
- L17. From the publication “Study on the Provision of Carbon Monoxide Detectors Under The Building Regulations” (<http://www.communities.gov.uk/publications/planningandbuilding/studycarbonmonoxidedetectors>) commissioned by CLG in England & Wales, the value of preventing deaths and injuries is as follows –
- the value of each death prevented is £1,723,657;
  - the value of a serious injury prevented is £193,677; and
  - the value of a minor injury prevented is £14,932.
- L18. The effectiveness of a CO detector at reducing the Northern Ireland annual average fatality rate due to CO poisoning rate is taken to be 75%. The figure is not 100% due to incidents arising that are distant from the location of any new detector e.g. fume re-entry from same or adjacent dwelling. Therefore the value of prevented deaths and injuries is reduced as follows –
- each death prevented - £1,292,742;
  - a serious injury prevented - £145,257; and
  - a minor injury prevented - £11,199.
- L19. The proposed amendment would impact only on –
- new dwellings that include a combustion appliance within the dwelling; and
  - a dwelling where subsequent installation of a combustion appliance is proposed (as either a new installation or replacement).
- L20. Monetised benefits are summarised in Table L1.

### **Benefits**

Potential benefits in terms of deaths and injuries avoided are summarised as follows –

<b>Table L1: Summary of monetary value of benefits in terms of detection and injuries prevented</b>		
		<b>Total monetary benefit</b>
Deaths prevented per annum	2 @ £1,292,742	£2,585,484
Serious injury prevented p.a.	8 @ £145,257	£1,162,056
Minor injury prevented	32 @ £11,199	£358,368
	<b>Total</b>	<b>£4,105,908</b>

L21. The proposed inclusion of guidance is considered unlikely to lead to any significant new burden, cost or benefit in relation to incorporating concealed flue guidance, given that this guidance has been in operation for gas appliance installations since 2007 when CORGI first published a Technical Bulletin on the matter. The only potential impact arises from the fact that the proposed amendment would also apply to solid fuel and oil fired appliances. However, although no data exists, it is considered unlikely that there would be a significant incidence of long horizontal flues for solid fuel or oil appliances. It is therefore considered that this proposed amendment will be cost neutral.

### **Costs**

L22. An estimate of the cost of mandating the provision of CO alarms has been made based on the following factors:-

- the number of new dwellings built per annum;
- the number of new or replacement combustion appliances installed in existing dwellings; and
- the unit cost of a CO alarm.

L23. The average number of dwellings constructed annually is 13,986 (see Appendix 4 para. K22). Approximately 75% use oil as their primary heating fuel (mainly external to the dwelling), the remainder use gas or solid fuel (internal). An estimated 80% of dwellings (11,190) would have an internal combustion appliance – either gas, oil or solid fuel including secondary heat sources.

With a replacement cycle of 20-25 years, it is estimated that 10,000 -12,000 appliances may be replaced each year (the higher rate is used in Table 2 below)

L24. A base case detector alarm has been chosen for use in this cost benefit analysis. This is a sealed battery unit which conforms to BS EN 50291:2001. The average price of this detector is approximately £25. No separate figure has been allowed for an installation cost. As the base case detector will be a sealed battery unit it will not incur any maintenance costs. Table L2 summarises these costs.

<b>Table L2: Cost of mandating CO alarms</b>				
	<b>No. of new dwellings per year</b>	<b>No. presumed to comply</b>	<b>Unit cost of a CO alarm</b>	<b>Annual cost £</b>
<b>New dwellings</b>	13,986	11,190	£25.00	£279,750
<b>Existing dwellings</b>	740,000	12,000	£25.00	£300,000
			<b>Total</b>	<b>£579,750</b>

L25. It should be noted here that this cost benefit analysis calculates the cost of providing and maintaining a CO detector in every dwelling with a new combustion device. Replacement costs are not considered.

## Ventilation for non-room-sealed combustion appliances: requirement for air-permeability

- L26. Regulation L2 of the Building Regulations states that “A combustion appliance shall be so installed as to receive a sufficient supply of air to ensure the safe and efficient operation of the combustion appliance and any connected flue”.
- L27. Changes in energy efficiency provisions (Part F) have resulted in increasingly high standards of air tightness in new dwellings. Current provisions on air supply in Technical Booklet L are based on assumptions about adventitious (uncontrolled) ventilation from cracks and leaks in the building fabric. In modern, more air tight, homes additional ventilation may be necessary to ensure that combustion appliances can continue to function safely. This issue only affects those appliances, such as open fires, that draw oxygen for combustion from the room in which they are situated.
- L28. The proposed amendment would impact only on –
- new dwellings that include an open flue or flueless appliance (a relevant appliance); and
  - a dwelling where subsequent installation of a relevant appliance is proposed.
- L29. The value of preventing death or injuries from CO poisoning is detailed at paragraphs L17 & L18.
- L30. An estimate of the costs of this proposal has been made based on the following factors –
- the number of new dwellings built per annum;
  - the number of solid fuel, display fire effect (DFE) and flueless appliances to be installed in such homes both at the time of construction and where such a relevant appliance is to be installed at a later date;
  - the unit cost of a through-wall ventilation kit; and
  - the installation cost of the through-wall ventilation kit both at the time of construction and as a retrofit.
- L31. There is an absence of data on the number of DFE fires, solid fuel appliances or flueless appliances that are installed in the Northern Ireland dwelling stock. In the absence of this data it is estimated that 72%<sup>3</sup> of new dwellings are fitted with relevant appliances and that 5 per cent of existing dwellings that have a high standard of air tightness will have relevant appliances fitted each year.
- L32. New dwellings with plans deposited since December 2006 should be designed to have a high standard of air tightness. It is estimated that there should therefore be approximately 42500 new dwellings built between 2007 and 2011 (5% of which will have appliances replaced annually).

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<sup>3</sup> In Northern Ireland 10% of dwellings are flats<sup>#</sup>, the remaining 90% of new dwellings are houses of which approximately 80% will have some form of secondary heating using solid fuel, DFE or open flued combustion appliance i.e. 80% of 90% = 72%.

#[www.ninis.nisra.gov.uk/mapxtreme/viewdata/Natural\\_and\\_Built\\_Environment/Housing/Domestic\\_Properties\\_LPS/Domestic\\_Properties\\_2009.xls](http://www.ninis.nisra.gov.uk/mapxtreme/viewdata/Natural_and_Built_Environment/Housing/Domestic_Properties_LPS/Domestic_Properties_2009.xls)

- L33. The average unit cost of a through-wall ventilation kit has been calculated at £11.41 (AMA Research Ltd. (2009) Domestic Heating Market – UK 2009-2013).
- L34. Some older dwellings may have a high standard of air tightness but this would be impossible to quantify.
- L35. It is estimated, informed by the Building Services Research and Information Association (BSRIA), that a through-wall installation kit is likely to take a maximum of one hour for fitting in a new build development and 3 hours to retrofit in an existing home. In the UK, the average hourly wage for ‘Skilled construction and building trades’ is estimated to be £11.32 in 2008, taken from the ONS’s Annual Survey of Hours and Earnings (ASHE). The total, installed cost (unit cost + labour) of the ventilator is therefore estimated at £22.73 for new homes and £45.37 for retrofit.
- L36. Table L3 summarises the estimated costs of complying with the proposed air-permeability standards.

<b>Table L3: Cost of requiring air-permeability</b>				
			<b>Unit cost of a through-wall ventilation kit</b>	<b>Annual cost £</b>
<b>New dwellings</b>	13,986	72% with secondary heating (10,070)	22.73	£228,889
<b>Dwellings built per annum (2007 – 2011)</b>	42500	5% install or replace an open-flued or flueless combustion appliance	45.37	£96,411
<b>Total</b>				£325,300

### **Benefits**

- L37. The potential benefits in terms of deaths and injuries avoided have not been calculated, however avoiding an average of only 1 death or two serious injuries per annum would render the proposal cost effective.

### **Additional benefits not monetised**

- L38. The benefit of avoiding the likely high number of deaths and injuries that would occur if adequate ventilation requirements are not specified for air-tight new build dwellings.

## **COMPLIANCE COSTS**

- L39. Option 1 is not viable.
- L40. Option 2 would incur publicity costs but would not generate any benefit in terms of preventing deaths or injuries from CO poisoning.
- L41. Option 3 – is the best option given that estimated monetary benefits of £4,105,908 and costs of £905,050 give a benefit cost ratio of 4.54:1.

## **SUMMARY AND RECOMMENDATION**

- L42. Option 1 is not viable because the regulations and Technical Booklet need to be converted to a guidance-based system, and the policy to make installation of CO alarms compulsory needs to be implemented.
- L43. Option 2 provides no long term benefits in terms of harmonising standards or preventing injuries or deaths from CO poisoning, but would incur costs in publicising best practice.
- L44. Option 3 would bring standards up to date with those in England & Wales, and in fact go slightly further in relation to mandating CO alarms for all combustion appliances installed or replaced in new and existing dwellings.
- L45. On this basis the Department's recommendation is Option 3 – amend Part L of the Building Regulations (Northern Ireland) 2000 and provide updated guidance in Technical Booklet L.

# PROPOSED AMENDMENTS TO PART P: SANITARY APPLIANCES AND UNVENTED HOT WATER STORAGE SYSTEMS

## BACKGROUND

- P1. It is not viable locally, within the timescale of this review of the 2000 Building Regulations, to undertake a complete technical uplift to Part P to reflect all the changes England & Wales introduced in their equivalent Part G in 2010. The current proposals are therefore limited to a new requirement and guidance to reduce the number of deaths and severe injuries caused by scalding from contact with very hot water supplied from sanitary fittings in buildings.

## PROPOSED CHANGES

- P2. It is proposed to amend Part P to require the fitting of an in-line blending valve to limit the temperature of hot water supplied to a fixed bath to 48<sup>0</sup>C, and in certain conditions limit the temperature of the hot water distribution system to prevent scalding.

## RISK ASSESSMENT

- P3. Scalding - serious injury from contact with, or immersion in, very hot water - is a risk that exists every day in many buildings, particularly in homes. The severity of injury depends on several factors – the temperature of the water, the period of contact, the type of contact (spray or immersion) and the age and health of the affected person. Very young and elderly people are particularly at risk from scalding by very hot water.
- P4. Although accident data on scalding incidents is collated by Health Trusts in Northern Ireland it is not sufficiently detailed to permit extraction of data relevant to this proposal for Building Regulations. Data used in this assessment is therefore based on incidents recorded in England.
- P5. In England in 2006/07 (Table P1, Hospital Episode Statistics) there were 19 fatalities and 768 serious (Cat A and Cat B) injuries caused by scalding<sup>4</sup>. Although many more minor injuries are attributed to hot water from showers and wash hand basins, (Sambrook, 1999) all fatalities and 93% of severe injuries are associated with very hot water from bath taps. Applying these statistics to the Northern Ireland population profile equates to 1 fatality and 26 serious scalding injuries per year.<sup>5</sup> (Table P2)

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<sup>4</sup> Source: Hospital Episode Statistics (HES) is a data source containing details of all admissions to NHS hospitals in England. The data for admitted cases is organised in many ways, including by external cause of admission.

<sup>5</sup> To nearest whole number

<b>Table P1 Hospital Episode Statistics (England)</b>								
<b>Number of scald Injuries per year split by age, appliance and severity in England</b>								
	<b>Baths</b>				<b>Shower</b>		<b>Washbasin taps</b>	
<b>Age</b>	<b>Fatalities</b>	<b>Cat B</b>	<b>Cat A</b>	<b>Minor</b>	<b>Cat A</b>	<b>Minor</b>	<b>Cat A</b>	<b>Minor</b>
<b>0- 14</b>		207	180		12		17	
<b>15- 59</b>		57	117		6		7	
<b>60- 74</b>		50	17		2		3	
<b>75+</b>		65	21		3		4	
<b>Total</b>	<b>19</b>	<b>379</b>	<b>335</b>	<b>2599</b>	<b>23</b>	<b>405</b>	<b>31</b>	<b>371</b>

<b>Table P2 Hospital Episode Statistics (Northern Ireland)</b>								
<b>Estimated number of scald Injuries per year split by age, appliance and severity in N Ireland by population profile (all totals have been taken to nearest whole number)</b>								
	<b>Baths</b>				<b>Shower</b>		<b>Washbasin taps</b>	
<b>Age</b>	<b>Fatalities</b>	<b>Cat B</b>	<b>Cat A</b>	<b>Minor</b>	<b>Cat A</b>	<b>Minor</b>	<b>Cat A</b>	<b>Minor</b>
<b>0- 14</b>		7	6		0		1	
<b>15- 59</b>		2	4		0		0	
<b>60- 74</b>		2	1		0		0	
<b>75+</b>		2	1		0		0	
<b>Total</b>	<b>1</b>	<b>13</b>	<b>11</b>	<b>89</b>	<b>1</b>	<b>14</b>	<b>1</b>	<b>13</b>

Note: Injuries defined as “severe” in the Sambrook report may be divided into 2 further categories: Category A (involving 1-4 in-patient days) and Category B (involving 5 or more days as an in-patient and/or transfer to a specialist hospital/burns unit). Source: “The Sambrook Report: Burns and scalds accidents in the home”- DTi, Government Consumer Safety Research 1999 <http://www.humanics-es.com/burns.pdf>.

## Vulnerable persons

- P6. Young children (sensitive skin) and elderly people (thinner skin) are the groups at greatest risk from scalding injuries from hot baths. Young children who fall into hot baths are likely to be severely scalded, often with 20%-50% body burns and occasionally 70% burns (Sambrook). Elderly people with slower reaction times and mobility difficulties will take longer to get out of a bath that is too hot. Although many vulnerable persons are already protected in NHS and housing association premises by temperature controlled hot water vulnerable persons including children living in private accommodation do not have the same level of protection.

## Options

- P7. Three options have been examined: –
- Option 1 – do nothing;
  - Option 2 – provide guidance for existing Part P and publicise best practice;
  - Option 3 – amend Part P of the Building Regulations to bring it into harmony with England & Wales (in relation to scalding), and provide guidance.

## **BENEFITS AND COSTS**

### **Option 1 – Do Nothing**

P8. Doing nothing is not a viable option. Firstly, there would be no reduction in deaths or injuries caused by scalding. Also, in order to introduce a guidance based system the Department must convert the Building Regulations and all Technical Booklets simultaneously. The Department is committed to making this change to provide the necessary flexibility to maintain harmony, as far as practicable, with the building regulations in England & Wales.

### **Option 2 – Provide guidance for the existing Part P and publicise best practice**

P9. This would mean doing the minimum to convert Part P and Technical Booklet P to a guidance based system and to publicise good practice.

P10. The benefit in adopting Option 2 is that it would facilitate the transition of the Building Regulations to a guidance based system. Although adopting this option could potentially reduce scalding in the short term, the likelihood of it being sustainable year on year is doubtful. Unless the temperature of water entering a bath can be limited there will always be the potential for accidental scalding. However, this option would leave the technical requirements unchanged, thus failing to achieve the objective of partial technical harmony with the rest of the UK. Builders, developers and plumbing engineers will make commercial decisions on whether or not to include in-line blending valves in the overall costs. At a time of falling equities and profits within the building industry the potential for voluntary success is limited. It is not possible to quantify fully costs for this option.

P11. The Department of Health Social Services and Public Safety plus other bodies like the Royal Society for the Prevention of Accidents, have supported the development of good practice guidance in this field for many years, with limited effect. Voluntary guidance may have some short-term benefits to the NHS through the reduction of direct costs for healthcare however it is unlikely that these would be sustained year on year. Experience has shown that undertaking a publicity campaign alone to highlight good practice to those in the industry who are not following such practices is unlikely to have a significant long-lasting effect.

### **Option 3 – Amend Part P of the Building Regulations to require installation of in-line blending valves (thermostatic mixing valves)**

P12. Hot and cold water entering an in-line blending valve is mixed to a temperature pre-selected by the user or installer. This temperature limitation is achieved automatically by a thermally sensitive mechanism within the valve that proportions the amount of hot and cold water entering to produce the required blend<sup>6</sup>. The mechanism then automatically compensates for any variations in supply pressures

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<sup>6</sup> Source: BRE IP 14/03 'Preventing hot water scalding in bathrooms: using TMVs'. 2003

or temperatures to maintain the pre-selected temperature. In the event of a cold water supply failure, the in-line blending mechanism will automatically shut down the flow to prevent discharge of dangerously hot water.

- P13. The provision of temperature control, normally by thermostatic control at, or close to outlet points, reduces the risk of where legionella contamination may arise to a small portion of supply pipework.
- P14. The inclusion of inline thermostatically controlled tempering valves to the outlet of hot water storage vessels / heat stores reduces the risk of excessively high temperatures occurring where solar heat collectors or solid fuel boilers do not have intervening controls between the boiler and the hot water storage vessel.
- P15. Fitting an in-line blending valve reduces the risk of scalding from that appliance to zero. This is a key premise in calculating reduced risk by making in-line blending valves mandatory in new dwellings. The regulatory change supports best practice in the design and installation of such systems.
- P16. This option allows Northern Ireland to achieve harmony in relation to scald prevention with the rest of the UK. Benefits will accrue where scalds and fatalities that would be caused by hot water from sanitary appliances are prevented by the installation of in-line blending valves. The benefit is the cost of injury or death that has been prevented.
- P17. In Northern Ireland the average build rate for dwellings (from 2004/05 to 2009/10) was 13,986 units per annum (with an average household occupancy of 2.29 in 2009 calculated from projected housing stock and population). Therefore 32,028 people could be protected from potential scald injuries in the first year after in-line blending valves are fitted to baths in all new homes. Benefits will increase year on year as more households are protected.
- P18. With an average of 13,986 new dwellings built per annum and at an approximate cost of £40.00 - £50.00 per mixer installation, the additional annual building cost of these proposals is £559,440 - £699,300.
- P19. The total annual cost of scald injuries in N Ireland (including fatalities) currently amounts to £2.56 million. Table P3 below shows a breakdown of the costs involved -
- P20. The benefits associated with this Option can be estimated by applying the proportion of population that will be protected (32,028 people protected per annum see para. P17) against the total costs of fatalities and injuries from baths. (£2.5 million see para. P19)
- P21. The cost of scald injuries in N Ireland could be reduced by £50,000 through the introduction of scald protection measures.

<b>Table P3: Summary costs by age &amp; severity of injury</b>			
<b>Age/Severity</b>	<b>Cost per person (£)</b>	<b>No. people affected per year (Category)</b>	<b>Total cost by age/severity (£)</b>
<b>All ages Fatal</b>	1,558,612	1	1,558,612
<b>Very serious</b>			
0–14 very serious with intensive care	80,516	2	161,032
0–14 very serious without intensive care	72,246	5	361,230
15–59 very serious with intensive care	26,374	1	26,374
15–59 very serious without intensive care	17,349	1	17,349
60–74 very serious with intensive care	27,589	1	27,589
60–74 very serious without intensive care	18,564	1	18,564
75+ very serious with intensive care	27,589	1	27,589
75+ very serious without intensive care	18,564	1	18,564
<b>Serious</b>			
0–14 serious	41,134	6	246,804
15–59 serious	13,872	4	55,488
60–74 serious	14,555	1	14,555
75+ serious	14,555	1	14,555
<b>Minor injuries</b>	180	89	16,020
<b>TOTAL</b>			<b>2,564,325</b>

## OTHER COSTS

P23. There are a large number of additional benefits that cannot readily be costed. These include: a reduction in trauma and long-term emotional problems for the individuals injured; lost work days to industry (minor injuries) and loss of income to individuals (serious injuries); loss of earnings to the parents or carers of young/elderly; costs associated with daily living activities (adapted accommodation, transport costs etc). It is expected that a ripple effect would be produced whereby the practice of installing temperature limitation in new dwellings would extend to the

retrofitting of temperature limiters in existing dwellings through propagation of good practice.

## **COMPLIANCE COSTS**

P24 Compliance costs are as follows –

- Option 1 – maintains the status quo.
- Option 2 – publicity and guidance have been given by other Departments but has not had a long term effect.
- Option 3 – is the best option given that there will be no significant additional costs (£40-£50 per dwelling) while assisting to achieve the desired outcome of reducing the risk of scalding of vulnerable people.

## **SUMMARY AND RECOMMENDATION**

P25. Option 1 does not have any benefits.

P26. Option 2 imposes some costs on Government, but provides no long term benefits.

P27. Option 3 will provide more up-to-date regulations and guidance broadly in line with building regulations elsewhere in the UK in relation to scalding.

P28. The net total cost in year 1 is estimated to be approximately £572,000 (additional annual building costs in N Ireland (para.P18) less benefits (para P21). The benefit to the NHS budget will be cumulative with year on year reductions in the costs of scald injuries. However due to the absence of scald protection in existing housing, zero risk from scalding in baths will not be achieved for at least one generation.

P29. On the basis of the assessments presented in this paper, the Department's recommendation is Option 3 – to amend Part P of the Building Regulations (Northern Ireland) 2000 and to provide updated guidance and standards in a new Technical Booklet.