

OPEN

BUILDING REGULATIONS ADVISORY COMMITTEE
REVIEW OF PART G (HYGIENE) – PROPOSED PUBLICATION OF
THE CONSULTATION DOCUMENT

Issue

1. To seek BRAC Members' agreement to submit the Part G public consultation package to Ministers for publication.

Background

2. A major review of Part G started in 2005 with a focus on hot water safety and water conservation. Significant progress was made with proposals for new functional requirements and a substantially revised Approved Document G to support them. However, there was no public consultation on the proposals and the work was overtaken by a wider review of the Building Regulations.
3. A separate consultation on the principles of introducing building standards for water efficiency was completed in March 2007 and there was strong support for using Building Regulations to introduce a calculated whole building performance standard for new homes. The Government made a commitment to introduce such a regulation in July 2007 and at the same time announced their intention to undertake a review of all aspects of Part G. In October 2007, Ministers agreed that work on water efficiency should be brought within the review of Part G.
4. A BRAC Working Party (WP) was set up in late 2007 to develop specific proposals under the chairmanship of John Tebbit. Other BRAC Members include Alastair Soane, Neil Cooper, Tracy Aarons, David Mitchell and Keith Bright. Individuals bringing expertise from the design, installation and product manufacturing sectors were co-opted on to the WP.

Recent Developments

5. Paper BRAC(08)P6, which was presented to main BRAC on 28 February, described the progress that was being made in the WP in developing the Consultation Document and supporting Impact Assessment. It also sought and received the Committee's endorsement of the interim proposals that had been developed thus far.

6. Paper BRAC(08)P6 indicated that due to the tight timescales that has been imposed on this review that there would only be a very limited time to comment on the final proposals prior to going to Ministers. BRAC therefore kindly agreed that the final Consultation Document could be circulated to Members by means of e-mail.
7. The Working Party last met on 10 March where a number of remaining issues were resolved. Since that time we have been further refining the Consultation Document, including those sections relating to:
 - **Hot Water Safety** - This review of Part G has considered whether it would be appropriate to introduce an amendment similar to that introduced in Scotland, which requires the installation of a Thermostatic Mixing Valve (TMV) on baths and bidets in homes to limit the temperature of water to 48°C. The Department would of course like to support a provision that would help to reduce the risk of scalding incidents from new sanitary appliances. However, the evidence currently available on the costs of installing suitable temperature controls and the readily monetised benefits of reducing the risk of serious injury or death from scalding does not support regulatory change. The Impact Assessment shows that the costs outweigh the benefits by at least 3 to 1. Therefore, as part of this consultation we are seeking further quantifiable evidence on the costs of treating injuries and the human impacts of these injuries.
 - **Competent Persons** – New text has been provided on the role of Competent Person Self Certification Schemes and specific questions asked within the Consultation Document as to their wider use under a new Part G.
 - **Cleanability** - There is no clear consensus on the need to address cleanability of sanitary fittings generally within the Building Regulations. Therefore, the desirability and justification of regulating for such a provision is being addressed in the Consultation Document, not least because many stakeholders suggest it can be dealt with by other means (Regulation 7, Materials and workmanship or market forces).
 - **Water Calculator** - The water calculator tool for assessing water efficiency for new dwellings has been further developed and is now included, along with a worked example, in the Consultation Document.

Recommendation

8. **Members are asked for their comments on the attached Consultation Document and Impact Assessment, and to confirm their agreement for it to move forward to publication. Unfortunately, due to the tight timescales we would like to receive Members' comments by Tuesday 22 April at the latest.**

9. **Please note the document will be subject to some further refining prior to presentation. Also the annexes are part of the Impact Assessment and provide further information on where TMVs are used and the build up of treatment costs.**

10. **If you have any comments please address them directly to Mike Johnson by e-mail - mike.johnson@communities.gsi.gov.uk**

**BRAC Secretariat
17 April 2008**

ANNEX A - CONTROL OF HOT WATER TEMPERATURE FROM SANITARY FITTINGS: DETAILED HEALTH IMPACT ASSESSMENT AND ANALYSIS OF THE COST OF SCALD INJURIES

Introduction

The objective of these proposals and the intended effect is presented in the body of the Impact Assessment. The impact assessment looks at the balance between the costs of hot water injury and the benefits of preventing these, against the costs of placing a limit on the temperature of water discharged in a range of sanitary appliances.

This Annex A fully evaluates the benefits and costs of a range of options:

- Control of hot water delivery to baths, showers and washbasins
- Introduction of controls to each of the sanitary appliances above for new buildings, extensions to existing buildings and change of use (conversions)
- Introduction of controls to each of the sanitary appliances above when an existing bathroom is replaced.

Note: the proposed changes are not intended to be applied under Building Regulations to this latter option, the replacement of sanitary appliances within existing properties. However, evaluating the relative benefits and costs provides a benchmark for the other options being considered. In practice, it is expected that a ripple effect would be produced whereby the practice of installing temperature limitation in some properties would extend to others through propagation of good practice.

Risk Assessment

Number of incidents in England and Wales

1. Number of fatalities

As there are no collated NHS statistics for the number of fatalities, the figure of 21 fatalities quoted in the Sambrook Report is used to define the number of fatalities per year due to hot tap water scalding.

This figure is an estimate of the number of fatalities per year, taken from the HADD database¹ over the 3-year period 1993-1995. As the HADD database is representative of the UK, this figure needs to be scaled down (using population figures in the respective DAs, Table 2) to represent the cases in England and Wales alone.

2. Number of serious incidents

The 2006-07 Hospital Episode Statistics (HES) data is the most reliable source of total admitted cases² by NHS hospitals. Information on admitted patient care delivered by NHS hospitals in England is provided against Code X11, Contact with Hot Tap Water. The data are categorised by age of patient. The total number of bed days is also provided.

¹ Source: Home Accidents Deaths Database

² Source: HES Online, <http://www.hesonline.nhs.uk>. **Admission episodes:** Episodes that were the first in the spell of admitted patient treatment (episodes with an episode order of 1). Note that this includes patients who were admitted in previous years (ie prior to 1 April).

Total finished consultant episodes³ (England) = 725.

Total bed days (England) = 4,394

Note 1: Bed days is the sum of all the days that patients in the group occupied hospital beds during the HES year (1 April 2006 to 31 March 2007).

Note 2: There is no further breakdown of 'Contact with Hot Tap Water'. For the purposes of this assessment, we have assumed all incidents are associated with wash basins, showers and baths. There may be cases associated with kitchen sink taps.

Note 3: For the purposes of this assessment, we have assumed that 'admitted cases' are serious cases (Categories A and B⁴) only. There is no indication of whether the HES figures for admitted cases include fatalities. Therefore, it has been assumed that fatalities are excluded from the number of admitted cases (these will be dealt with separately).

Note: It is anticipated that this can be verified by information provided during the public consultation.

This data has been adjusted to provide a total for England and Wales (Table 1) based on population (Table 2). The HES data included a count of episodes relating to patients of distinct age groups; the split of the total number of admitted cases by these age groups is also shown in Table 1. This will be used later in our analysis to model the different levels of risk faced by the different age groups.

Table 1 Finished consultant episodes (Source: HES 2006-7)

Age group	England (HES 2006-7)	England and Wales (adjusted)
0-14	393	416
15-59	177	187
60-74	67	71
75+	88	93
Total finished consultant episodes	725	767
Total bed days	4394	4651

Table 2: Population by country (Source: National Statistics Online)

	Population
England	50,762,900
Wales	2,965,900
Scotland	5,116,900
Northern Ireland	1,741,600
UK Total	60,587,300
England and Wales Total	53,728,800
Percentage increase England: England & Wales	5.84%

³ **Finished Consultant episodes:** A count of the number of HES records, submitted on behalf of English NHS hospital providers, that relate to episodes of admitted patient care that ended during the financial year (1 April to 31 March). (HES Online- Explanatory Notes).

⁴ 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>.

3. Number of minor incidents

The Sambrook Report stated a total number of minor injuries per year. It has been assumed that minor injuries continue to occur at the same level as 1999 when the report was prepared. There is no reason to consider otherwise.

The estimated number of minor injuries for England and Wales in 2008, based on current population, is therefore 3,375.

There is no breakdown of minor injuries by hot water from individual sanitary appliances or by age.

Number of incidents by individual sanitary appliances

1. Attribution of cases to individual sanitary appliances

The former DTi commissioned a detailed study into the attribution of incidents of scalding by hot tap water, published as “The Sambrook Report: Burns and scalds accidents in the home”- DTi, Government Consumer Safety Research, 1999 (<http://www.humanics-es.com/burns.pdf>).

The number of minor and severe scald incidents that can be directly attributed to (hot water from) baths, showers and taps is taken from the Sambrook report and reproduced in Table 3 below. All values are annual estimates.

Note: This table was constructed using HASS and LASS datasets⁵ over the 5-year period 1992-1996 and the HADD database⁶ (for fatal injuries) over the 3-year period 1993-1995. HASS and LASS databases are taken from a representative sample of hospital attendances around the UK.

In addition, the Sambrook report provided data on the number of minor injuries due to hot tap water: this is not now recorded in the HES.

Table 3 Number of injuries caused by hot tap water from sanitary appliances per year in the UK

	Total injuries	Minor injuries	Severe injuries	Fatal injuries
Shower	340 (10%)	324 (12%)	16 (3%)	0
Taps	331 (10%)	306 (11%)	25 (4%)	0
Baths	2677 (80%)	2103 (77%)	574 (93%)	21 (100%)
Total	3348	2733	615	21

This is the most recent detailed and published study attributing scalds to sanitary appliances. Therefore we have assumed the ratio of scalds attributed to each sanitary appliance and the ratio of minor to severe injuries is still current.

Note: It is anticipated that this can be verified by information provided during the public consultation.

2. Severity of scalds by individual sanitary appliances

The further division of data into the severity of scalds and the age of the injured person allows more accurate costing of the care offered to patients in this Impact Assessment.

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).

⁵ Home Accident Surveillance System and Leisure Accident Surveillance System (www.hassandlass.org.uk)

⁶ Home Accidents Deaths Database

The Sambrook report only presents the division of Categories A and B for bath injuries; Table 4 reproduces this information. This has been used to estimate a split in the current number of severe injuries (HES) to give a split by age band.

Table 4 Division of ‘severe’ cases into Category A and Category B (for baths only) – Sambrook

Age group	Percentage of severe injuries in Category B	Percentage of severe injuries in Category A = (100%-Cat. B%)
0-4	67%	33%
5-10	33%	67%
11-17	33%*	67%
65+	75%	25%
* Sambrook report: ‘There are insufficient cases to differentiate between Category A and B injuries.’. For this impact assessment, we have assumed same % as for 5-10 year olds.		

The age bands used in the Sambrook Report do not match those used in HES data, so the HES age bands have been used. This re-allocated information is presented in Table 5.

Table 5 Division of ‘severe’ cases into Category A and Category B (for baths only) – HES age bands

Age group	Percentage of severe injuries in Category B	Percentage of severe injuries in Category A = (100%-Cat. B%)
0-14	53.5%	46.5%
15-59	33%	67%
60-74	75%	25%
75+	75%	25%

There are no similar data available for showers and wash basins (to split severe cases down any further into category A and category B), therefore we have assumed that all severe injuries due to hot water from showers and wash basin taps are Category A.

Using the information in Tables 3 and 5, together with the assumption above on showers and wash basins, we have summarised the number of injuries in England in Wales per year by sanitary appliance, by age group and by severity of injury in Table 6.

Table 6 Summary of injuries by sanitary appliance, by age group and by severity of injury

Age band	No. severe cases (E&W)	Baths			Showers Category A	Washbasin taps Category A
		Total Baths	Category B (5 days +)	Category A (1-4 days)		
0-14	416	387	207	180	12	17
15-59	187	174	57	117	6	7
60-74	71	66	50	16	2	3
75+	93	86	65	21	3	4
Total	767	713	379	334	23	31
<i>Source of data</i>	<i>HES 2006-7 pro-rata for England and Wales</i>	<i>Percentage by appliance from Sambrook</i>	<i>Number of severe cases in B Sambrook</i>	<i>Balance of total severe cases - calculation</i>	<i>Percentage by appliance from Sambrook. Category A assumed.</i>	<i>Percentage by appliance from Sambrook. Category A assumed.</i>

Consultation Note: It is anticipated that this can be verified by information provided during the public consultation.

The Cost of Care

1. Cost of hospital beds

The average cost of a 'Normal' NHS hospital bed day is £223.

Source: This is inpatient rehabilitation services (cost per bed): weighted average of all patient rehabilitation stays excluding patients with brain injuries- from Unit Costs of Health and Social Care, 2007.

The cost of a hospital bed day in a Burns Intensive Care Unit depends upon the level of care required in each case. Table 7 gives, for all burns (not only hot water scalds), the national average unit cost of bed day by level of care. The weighted average of these costs, £1769, has been used to establish a value for an NHS hospital bed day in intensive care for use in this assessment.

Source: National Schedule of Reference Costs 2005-06 for NHS Trusts, Critical Care Services Data (Worksheet TCCS); available online from Department of Health: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_062884

Table 7 National average unit cost of bed day by level of care

Level of care	National Average Unit Cost of bed day	Number of occupied bed days	Cost (£) (Unit cost x Bed days)	Weighted average
1	£971	8336	£8,094,256	
2	£4,199	718	£3,104,882	
3	£3,303	3198	£10,562,994	
TOTAL		12252	£21,672,132	£1769

It has been assumed that all cases will require 'normal' bed days, but that a proportion of cases will also require additional nursing in intensive care. It has been assumed that these are Category B cases only. There is no published evidence of the proportion of severe cases requiring intensive care. Therefore it has been assumed that 25% of Category B cases will require additional care.

The additional cost of an intensive care unit bed day (over a normal bed day) is assumed to be £1769 - £223 = £1546.

Note: It is anticipated that this can be verified by information provided during the public consultation.

2. Cost of hospital beds attributed to sanitary appliances

There is no breakdown of number of bed days for scalds from individual sanitary appliances. Therefore the total number of bed days has been divided in the same proportion as number of cases attributed to each sanitary appliance (see Table 3). This is presented in Table 8.

Table 8 Cost of 'normal' NHS bed days attributed to hot tap water scalds by appliance

	% cases by sanitary appliance	Total number of bed days	Cost of normal bed days (£) @ £223/day
Baths	93	4325	£964,475
Showers	3	140	£31,220
Taps	4	186	£41,487
TOTAL		4651	£1,037,173
<i>Source of data</i>	<i>Table 3</i>	<i>Total bed days divided by % of cases - calculation</i>	<i>Bed days x cost of 'normal' bed day - calculation</i>

3. Treatment costs for hot water scalds

To estimate the cost of treatment for scald patients, data from the NHS costing manual were used. The NHS costing manual was introduced in November 1999 to bring greater consistency to the production of cost information. Cost codes J12 to J28 are used for the treatment of burns and have been used in these calculations.

To determine the treatments required for scalding incidents is extremely difficult, as each case is individual and will require varying treatments dependent upon the location, depth and area

of the injury. Therefore to determine generic costs we have made some assumptions upon the treatment undertaken to give a standard “package” of care for each age band/severity group.

Care packages have been estimated for patients by age and severity of injury, as follows:

- Very Serious (Category B): children under age 0 - 14;
- Very Serious (Category B): aged 15 to 59;
- Very Serious (Category B): aged 60 to 74; and aged 75+
- Serious (Category A): children under age 0 - 14;
- Serious (Category A): aged 15 to 59;
- Serious (Category A): aged 60 to 74; and aged 75+
- Minor injuries: all ages

Detailed descriptions of the “package of care” for each of these groups can be found in Annex C.

Price per unit for treatment cost has been established from a number of sources:

- Ambulance and A & E visit for severe injuries: *Unit Costs of Health and Social Care, 2007, p.99: A&E Services: High cost investigation (referred/discharged) - National Average value.*
- A & E visit (minor injury): *Schedule of Reference Costs - NHS Trusts 2005-06. Lower Cost Investigation (Referred / Discharged) Code (page TA&E, code V06).*
- Extra cost of ITU bed day: Table 7 above
- Procedures for burns treatment: *National Schedule of Reference Costs - NHS Trusts 2005-06 (codes J12-J28)*
- The cost per death is estimated to be £1,558,612 (2005 prices from Highways Economics Note No. 1, 2005 Valuation of the Benefits of Prevention of Road Accidents and Casualties uprated to 2009-2010 prices).

Taking account of the cost of hospital beds (Table 7), the cost of treatment for each injury (Annex C) and the number of injuries each year split by age group (Table 6), we can estimate the total cost of hot tap water scalding.

For 2009, the total cost of scald injuries and fatalities from hot tap water was estimated as £61,277,677 (Table 9).
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The total cost of scalds caused by contact with hot tap water can be broken down to costs associated with scalds from each sanitary appliance. As stated above, it has been assumed that all fatalities and very serious (Category B) scalds are caused by contact with hot bath water.

As the most recent detailed and published study attributing scalds to sanitary appliances, the ratio of scalds per sanitary appliance presented in the Sambrook Report (Table 3) have been used to calculate the proportion of severe (Category A injuries) and minor injuries that can be attributed to each sanitary appliance.

Table 9: Summary of costs by age and severity of injury

Age/Severity	Cost per person (£)	No. people affected per year	No. people affected per year (Category B ratio assumed 1:3 ITU: non-ITU)	Total cost by age/severity (£)
All ages Fatal	1,558,612	19	19	29,613,628
0-14 very serious with intensive care	80,516	207	52	4,186,832
0-14 very serious without intensive care	72,246		155	11,198,130
15-59 very serious with intensive care	26,374	57	14	369,236
15-59 very serious without intensive care	17,349		43	746,007
60-74 very serious with intensive care	27,589	50	13	358,657
60-74 very serious without intensive care	18,564		37	686,868
75+ very serious with intensive care	27,589	65	17	469,013
75+ very serious without intensive care	18564		48	891,072
0-14 serious	41,134	209	209	8,597,006
15-59 serious	13,872	130	130	1,803,360
60-74 serious	14,555	21	21	305,655
75+ serious	14,555	28	28	407,540
Minor injuries	180	3375	3375	607,500
Normal bed days	223	4651		1,037,173
TOTAL				61,277,677

Note: the extra cost of intensive care bed days (over normal bed days) is included in cost of care as part of the package of care for (25% of) very serious scalds.

Table 10 Summary of costs by sanitary appliance

	Total cost by sanitary appliance (£)				Cost of normal bed days	TOTAL (£)
	Minor	Serious (Category A)	Very serious (Category B)	Fatal		
Baths	564,975	9,574,186	18,905,815	29,613,628	964,475	59,623,079
Showers	18,225	659,732	0	0	31,220	709,177
Taps	24,300	879,643	0	0	41,478	945,421
TOTAL (£)	607,500	11,113,561	18,905,815	29,613,628	1,037,713	61,277,677

Detailed costs and benefits of each proposed option

This section estimates the costs and benefits (a reduction in costs from scalding fatalities and injuries caused by hot tap water) for the range of options identified in this Impact Assessment. All costs (and benefits) are calculated using central estimates; a sensitivity analysis will be carried out later. A **ten-year period of analysis** has been chosen. In accordance with The Treasury's Green Book guidance, a **discount rate of 3.5%** has been applied to calculate present values. Costs and benefits are quoted below in **present values**.

Options

Option 3A - Do nothing

Option 3B - Increase public awareness of hazard.

Option 3C - Introduce a new Requirement to Part G of the Building Regulations for all new dwellings and extensions to, and change of use of, dwellings on the control of hot water temperature to baths.

Benefits

Option 3A: Do nothing - this would produce no additional benefits because there will be no reduction in scalding.

Option 3B: A public awareness campaign to increase public awareness of hazard the risks of scalding from hot water and the particular risks to young children and the elderly - there may be short-term benefits to the NHS through the reduction of direct costs for healthcare, for a short period.

In support of a review of Part G, BRE (2002) considered experience on other countries. The report draws on the experience of New Zealand and the educational programmes in place. Unfortunately these programmes have not been effective in reducing accidents. This was due, in part, to the variable quality of equipment used for hot water heating. Plumbers responsible for installation, modification and maintenance of hot water heating systems lacked a detailed knowledge of the risk of scalding posed by such systems. Awareness campaigns need to be repeated to maintain effectiveness.

Option 3C: Introduce a requirement for all new dwellings and extensions to, and change of use of, dwellings on the control of hot water temperature to all baths - 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.

The requirement would control hot water temperature to appliances used primarily for personal hygiene.

Option 3C: Monetised benefits

A number of scenarios have been costed under this option. For each scenario the benefits of adding temperature control through the uses of in-line blending valves to (a) baths and (b) showers and wash basins are presented.

Scenario 1: Introduce a requirement for all new dwellings

223,000 new homes will be built per year with an average household occupancy of 2.29 in 2009 (calculated from projected housing stock and population). Therefore 504,491 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.

Note: Since no figures could be found for projected housebuilding in Wales, it has been assumed that housebuilding in Wales will occur at the same rate as in England.

Consultation Note: It is anticipated that this can be verified by information provided during the public consultation.

The total benefits associated with this option were estimated by applying the proportion of the total current population that will be protected against the total costs of fatalities/injuries from baths (see Tables 9 and 10).

Total benefit of installing in-line blending valves in baths in new homes: £23.5 million.
Total benefit of installing in-line blending valves in showers and washbasins in new homes: £653,000.

Scenario 2: Introduce a requirement for all new extensions and change of use to dwellings.

There is little data on the number of extensions constructed across England and Wales, and the proportion that include sanitary accommodation. Therefore it has been assumed that:

- 10% of extensions will include a new bathroom, 30% will include a new cloakroom and 30% will include a new en-suite;
- each extension will only include the addition of one of these rooms - so 30% of all extensions will not include the addition of any type of new sanitary accommodation; and
- a total of 30,000 extensions are built.

Consultation Note: It is anticipated that if appropriate data does exist regarding number of extensions to dwellings, this would be provided during the public consultation.

New sanitary accommodation built as part of an extension will not be used by all of the inhabitants of a household (or it will not be used all the time by all inhabitants) since there is likely to be existing sanitary accommodation. Therefore, the inhabitants will not be totally protected from hot water scalds under this Requirement. Thus, benefits have been modelled as 50% of the benefits that would accrue if total protection were afforded. Benefits will increase year on year as more households are protected.

Total benefit of installing in-line blending valves in baths in extensions to dwellings: £158,000.
Total benefits from the installation of in-line blending valves to showers and wash basins in extensions are estimated to be £57,000.

There are 16,380 changes of use per year across England and Wales (based on 2007 figures for change of use, Planning Statistics, CLG). It is assumed that any buildings converted to dwellings will require hot water temperature control to all baths. Therefore, in-line blending valves will be fitted to all baths in sanitary accommodation in these dwellings and the risk of scalds from hot bath water will be reduced to zero. Benefits will increase year on year as more households are protected.

Total benefit of installing in-line blending valves on baths where there is a change of use to a dwelling: £1.7 million

Total benefit of installing in-line blending valves in showers and wash basins where there is a change of use to a dwelling: £48,000

Total benefit of installing in-line blending valves on baths in extensions where there is a change of use to a dwelling: £1.9 million

Total benefit of installing in-line blending valves in showers and wash basins in extensions where there is a change of use to a dwelling: £105,000

Scenario 3: Introduction of controls to sanitary appliances when an existing bathroom is refurbished and the baths, sinks etc. are replaced.

Note: It is not proposed to introduce this scenario under the Building Regulations as this is currently beyond the remit of the Regulations. However, evaluating the relative benefits and costs provides a benchmark for the other options being considered. In practice, it is expected that a ripple effect would be produced whereby the practice of installing temperature limitation in some properties would extend to others through propagation of good practice.

In terms of installing temperature control devices (In-line blending valves), the effect on risk of scalding is similar to building a new bathroom.

It has been assumed that 45% of replacement work will be in bathrooms, 35% in cloakrooms and 20% in en-suites. All include the replacement of all of the sanitary appliances in the room that is being refitted and all new sanitary appliances will be fitted with In-line blending valves.

Assuming a total of 20,000 replacement projects, the assumptions above along with assumptions already stated (Table 8) can be used to estimate the total number of new baths, showers and taps that will be installed under this option.

Consultation Note: It is anticipated that if appropriate data does exist regarding number of bathroom refits in dwellings, this would be provided during the public consultation.

Note: household occupants will not be fully protected from scalds by refurbishments since there may be other sanitary appliances in the house that have not been fitted with In-line blending valves (e.g. another bathroom that is not refurbished); therefore, it has been assumed that 75% of the benefits from total risk reduction will accrue.

Total benefit of installing in-line blending valves when replacing baths: £712,000

Total benefit of installing in-line blending valves when replacing showers and wash basins: £29,000

Option 3C: additional (non-monetised) benefits

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 individual, 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 living (adapted accommodation, transport costs etc.).

Costs

Option 3A: Do nothing – there are no direct costs associated with this option. However, selecting this option would mean that the benefits realised under Option 3B or 4C would be missed.

Option 3B: A public awareness campaign to increase public awareness of hazard the risks of scalding from hot water and the particular risks to young children and the elderly – the cost of this option would be small.

Option 3C: Introduce a requirement for all new dwellings and extensions to, and change of use of, dwellings on the control of hot water temperature to all baths - costs will arise from the purchase and installation of in-line blending valves.

Option 3C: costs

Number of In-line blending valves required per property:

Communities and Local Government Housebuilding Statistics (Table 254) were used to split the total housing stock by size of dwelling (i.e. number of bedrooms) - see Table 11. Note, since the installation of In-line blending valves in Housing Authority properties is recommended by the Housing Corporation's Scheme Development Standards (2003), these properties have been excluded from the analysis.

Through consultation with housebuilders, HBF and NHBC, assumptions were made about the number of bathrooms, cloakrooms and en-suites in dwellings of various sizes - see Table 12.

Table 11: Housing stock split by size (completed house building 2006-07, Source: CLG)

Type of dwelling	Number of bedrooms	% of total private enterprise housing	Number of properties built per year
House	1	0%	0
	2	6%	13380
	3	27%	60210
	4 or more	22%	49060
Flat	1	9%	20070
	2	34%	75820
	3	1%	2230
	4 or more	0%	0
Houses and flats	1	9%	20070
	2	40%	89200
	3	28%	62440
	4 or more	22%	49060

Table 12: Assumptions: sanitary accommodation in properties of various sizes

Size of property	Average Rooms included
1 bedroom flat	1 bathroom
2 bedroom flat	1 bathroom and 1 en-suite
2 bedroom house	1 bathroom and 1 cloakroom
3 bedroom property	1 bathroom, 1 en-suite and 1 cloakroom
4 or more bedroom property	1 bathroom, 1 en-suite and 1 cloakroom
<i>Source: HBF/ NHBC</i>	

Although we recognise that different houses of a particular type (e.g. one bed flat) could have different appliances, e.g. shower instead of bath, after consultation with HBF and NHBC we have developed a standard list of the number of sanitary appliances in each type of sanitary accommodation – see Table 13.

Table 13: Assumptions: sanitary appliances in bathrooms, cloakrooms and en-suites

Room	Hot water outlets	Number of In-line blending valves
Bathroom	1 washbasin 1 bath (with showerhead)	2
En-suite bathroom	1 washbasin 1 shower	2
Cloakroom	1 washbasin	1

Purchase and installation of In-line blending valves:

The design and range of thermostatic mixers available to the market is wide and varied as the manufacturers are very pro-active in meeting the demands of their customers. However generally the different designs can be grouped into 5 distinct products, as follows:

- Tee type valve, usually hidden from view;
- Single sequential mixer, mounted on the wash basin;
- Thermostatic shower valve exposed or concealed;
- Remote blending valve for large supplies;
- Bar type thermostatic valve, bath.

The cost of these products varies greatly with the exception of the Tee type valve. This valve is the cheapest valve available and can be fitted to the supply pipework leading to each terminal fitting, therefore it has been assumed that this type of valve will be used.

Costs suggested by the manufacturers are shown in Table 14. The cost to a builder/developer will vary as they usually buy in bulk and will therefore receive a discounted price dependent upon the number of valves purchased.

Table 14: Cost of a typical Tee Type valve.

Outlet size	Manufacturer's retail price	Price to householder
15mm	£25.60 to £40.66	£50 to £77.48
22mm	£ 28.00 to £48.45	£56 to £92.31

There will be a cost associated with the installation of in-line blending valves which is over and above the cost of installing bath taps for the tee type valve.

We estimate the cost of purchasing and installing each in-line blending valve to be £40 (central estimate).

Scenario 1: Introduce a requirement for all new dwellings

223,000 new homes will be built each year. These can be split according to size of house (Table 11). The number of In-line blending valves that will be installed in new houses (Table 13) is multiplied by the central value for in-line blending valve purchase and installation to give the total cost.

Total costs of installing in-line blending valves in baths in new dwellings: £73.4 million

Total costs of installing in-line blending valves in showers and washbasins in new dwellings: £239.6 million

Scenario 2: Introduce a requirement for all new extensions and change of use to dwellings.

The assumptions on number of extensions are presented against the benefits.

The number of in-line blending valves that will be installed in extensions is multiplied by the central value for in-line blending valve purchase and installation to give the total cost.

Total costs of installing in-line blending valves in baths in extensions to dwellings: £1 million

Total costs of installing in-line blending valves in showers and washbasins in extensions to dwellings: £13 million

The assumptions on change of use are presented against the benefits.

Splitting the 16,380 changes of use by the size of dwelling (using Table 11) and using the assumptions already discussed about number of bathrooms cloakrooms and en-suites in different sized dwellings (Table 12), and about sanitary appliances in each of these (Table 13), allows an estimate of the number of in-line blending valves that will be installed to be made.

Total costs of installing in-line blending valves in baths where there is a change of use to a dwelling: £5.4 million

Total costs of installing in-line blending valves in showers and washbasins where there is a change of use to a dwelling: £5.4 million

Total cost of installing in-line blending valves on baths in extensions where there is a change of use to a dwelling: £6.4 million

Total cost of installing in-line blending valves in showers and wash basins in extensions where there is a change of use to a dwelling: £18.3 million

Scenario 3: Introduction of controls to sanitary appliances when an existing bathroom is replaced.

The assumptions on replacement of sanitary appliances are presented against the benefits.

Using the assumptions above and the general assumptions about the number and type of sanitary appliances in bathrooms, cloakrooms and en-suites (Table 13), it was possible to estimate the number of baths, showers and taps that will have In-line blending valves fitted under this option. Assuming the central figure of £40 per in-line blending valve, it was possible to estimate the cost of introducing a Requirement for all refurbishments to sanitary accommodation in dwellings on the control of hot water temperature to all appliances used primarily for personal hygiene.

Total costs of installing in-line blending valves where baths are replaced: £3 million

Total costs of installing in-line blending valves where showers and washbasins are replaced: £8 million

Option 3C: additional costs

Once the building work has been completed (obviously to the required standards to meet the relevant functional requirements) and signed off then there is no requirement under the Building Regulations for continued maintenance. If maintenance is required, costs will fall to the householder. In addition there is a risk that maintenance may not be carried out and products will need to be designed with a fail-safe mode.

ANNEX B- Treatment Costs.

Table 1 Very Serious, Children aged 0-14

Activity	Cost code	Price per unit (£)		Number of units	Cost (£)
Ambulance		257	per admission	1	£257
A&E		111	per admission	1	£111
"Major burn procedure >29% burns"	J15	6198	per procedure	1	£6,198
"Soft tissue procedure"	J12	2678	per procedure	2	£5,356
"Other burn with significant graft procedure >49"	J20	3581	per procedure	15	£53,715
Plastic surgery	160/160F	85		15	£1,275
Pain management	191/191F	88		10	£880
Community nursing specialist	N29	66		4	£264
Community nursing district	N3	55		10	£550
Health visiting	N4/CN403FG	50		20	£1,000
Physiotherapy	N5/N5C1	64		10	£640
Play specialist	?	200	approx	10	£2,000
TOTAL PER PATIENT (without ICU bed days)					£72,238
"Intensive care nursing"	N26/CN206CF	108.329	per day	5	£540
Extra cost of ITU bed day		1546	per bed day	5	£7,730
TOTAL PER PATIENT (with ICU bed days)					£80,510

Table 2 Very Serious 15-59

Activity	Cost Code	Price per unit		Number of Units	Cost (£)
Ambulance		£257	per admission	1	£257
A&E		£111	per admission	1	£111
"Major burn procedure >29% burns"	J15	£6,198	per procedure	1	£6,198
"Soft tissue procedure"	J12	£2,678	per procedure	1	£2,678
"Other burn with significant graft procedure >49"	J20	£3,581	per procedure	2	£7,162
Plastic surgery	160	£73		2	£146
Pain management	191	£95		5	£475
Community nursing specialist	N29	£66		2	£132
Community nursing district	N3	£55		4	£220
Health visiting	N4/CN403FG	£50		6	£300
Physiotherapy	N5/N5A1	£29		5	£145
TOTAL PER PATIENT (Without ICU bed days)					7,824
Extra cost of ITU bed day	See Annex B, Table 7	£1546	Per bed day	5	£1,295
"Intensive care nursing"	N26/CN206AF	£259	Per day	5	£7,730
TOTAL PER PATIENT (with ICU bed days)					£26,849

Table 3 Very serious (Category B): aged 60 – 74 and aged 75+

Activity	Cost Code	Price per unit		Number of Units	Cost (£)
Ambulance		£257	per admission	1	257
A&E		£111	per admission	1	111
"Major burn procedure >29% burns"	J15	£6,198	per procedure	1	6198
"Soft tissue procedure"	J12	£2,678	per procedure	1	2678
"Other burn with significant graft procedure >49"	J20	£3,581	per procedure	2	7162
Plastic surgery	160	£73		2	146
Pain management	191	£95		5	475
Community nursing specialist	N29	£66		2	132
Community nursing district	N3	£55		12	660
Health visiting	N4/CN403FG	£50		12	600
Physiotherapy	N5/N5A1	£29			145
TOTAL PER PATIENT (without ICU bed days)					£18,564
"Intensive care nursing"	N26/CN206AF	£259	per day	5	
Extra cost of ITU bed day		£1,546	per bed day	5	
TOTAL PER PATIENT (with ICU bed days)					£27,589

Table 4 Serious (Category A): aged 0 – 14

Activity	Cost Code	Price per unit		Number of Units	Cost (£)
Ambulance		£257	per admission	1	£257
A&E		£111	per admission	1	£111
"Major burn procedure >29% burns"	J15	£6,198	per procedure	1	£6,198
"Soft tissue procedure"	J12	£2,678	per procedure	1	£2,678
"Other burn with significant graft procedure >49"	J20	£3,581	per procedure	8	£28,648
Plastic surgery	160/ 160F	85		3	£255
Pain management	191/ 191F	£88		5	£440
Community nursing specialist	N29	£66		2	£132
Community nursing district	N3	£55		5	£275
Health visiting	N4/CN403FO	£50		10	£500
Physiotherapy	N5/ N5C1	£64		10	£640
Play specialist		£200	approx	5	£1,000
TOTAL PER PATIENT					£41,134

Table 5 Serious (Category A): aged 15-59

Activity	Cost Code	Price per unit		Number of Units	Cost (£)
Ambulance		£257	per admission	1	£257
A&E		£111	per admission	1	£111
"Major burn procedure >29% burns"	J15	£6,198	per procedure	1	£6,198
"Soft tissue procedure"	J12	£2,678	per procedure	1	£2,678
"Other burn with significant graft procedure >49"	J20	£3,581	per procedure	1	£3,581
Plastic surgery	160/ 160F	73		1	£73
Pain management	191/ 191F	£88		5	£440
Community nursing specialist	N29	£66		2	£132
Community nursing district	N3	£55		3	£165
Health visiting	N4/CN403FO	£50		3	£150
Physiotherapy	N5/ N5C1	£29		3	£87
TOTAL PER PATIENT					£13,872

Table 6 Serious (Category A): aged 60 – 74 and aged 75+

Activity	Cost Code	Price per unit		Number of Units	Cost (£)
Ambulance		£257	per admission	1	£257
A&E		£111	per admission	1	£111
"Major burn procedure >29% burns"	J15	£6,198	per procedure	1	£6,198
"Soft tissue procedure"	J12	£2,678	per procedure	1	£2,678
"Other burn with significant graft procedure >49"	J20	£3,581	per procedure	1	£3,581
Plastic surgery	160/ 160F	73		1	£73
Pain management	191/ 191F	£88		5	£440
Community nursing specialist	N29	£66		2	£132
Community nursing district	N3	£55		8	£440
Health visiting	N4/CN403FO	£50		10	£500
Physiotherapy	N5/ N5C1	£29		5	£145
TOTAL PER PATIENT					£14,555

Table 7 Minor injuries- all age groups

Activity	Cost Code	Price per unit (£)		Number of Units	Cost (£)
A&E visit		80	Per admission	1	80
Outpatient visit		50	Per visit	2	100
TOTAL PER PATIENT					180

ANNEX C

Table 1: Application of TMVs

Location		Is a TMV required by legislative or authoritative guidance?	Is a TMV recommended by legislative or authoritative guidance?	Is a TMV suggested best practice?	Reference documents	What type of valve?	
Private dwelling	Bath			Yes		TMV 2	
	Basin						
	Shower						
Housing Association dwelling	Bath		Yes		Housing Corp Standard	TMV2	
	Basin						
	Shower						
Housing Association dwelling for the elderly	Bath	Yes			Housing Corp Standard	TMV2	
	Basin						
	Shower						
Hotel	Bath			Yes	Guidance to the Water Regulations (G18.5)	TMV2	
	Basin						
	Shower						
NHS Nursing Home	Bath		Yes		NHS Health Guidance Note, Care Standards Act, Care Homes Regulations and DO8	TMV3	
	Basin						
	Shower						
Private Nursing Home	Bath		Yes		Guidance to the Water Regulations (G18.6), Care Standards Act, Care Homes Regulations and HSE Care Homes Guidance	TMV3	
	Basin						
	Shower						
Young persons care home	Bath	Yes			cRegulations, Care Standards Act, Care Homes Regulations and HSE Care Homes Guidance	TMV3	
	Basin						
	Shower						
Schools, including nursery	Bath	Yes, but 43°C max			The School Premises Regulations / National minimum care Standards Section 25.8	TMV2	
	Basin						Yes
	Shower						
Schools for severely disabled, including nursery	Bath	Yes, but 43°C max			The School Premises Regulations and, if residential, Care Standards Act	TMV3	
	Basin						Yes
	Shower						
NHS hospital	Bath	Yes			NHS Health Guidance Note and DO8	TMV3	
	Basin						
	Shower						
Private hospital	Bath		Yes		NHS Health Guidance Note and DO8	TMV3	
	Basin						
	Shower						