

# **Energy Use in Homes**

**A series of reports on domestic energy use in  
England**

## **Thermal Insulation**



# Energy Use in Homes

## A series of reports on domestic energy use in England

**This is one of a series of three reports on the energy characteristics of the stock as observed by the 2003 English House Condition Survey.**

**The reports in this series are:**

- 1. Space and Water Heating**
- 2. Thermal Insulation**
- 3. Energy Efficiency**

*The English House Condition Survey is funded and provided courtesy of Communities and Local Government. More information about this survey can be found at [www.communities.gov.uk/ehcs](http://www.communities.gov.uk/ehcs)*

*The 2003 EHCS Energy Analysis has been prepared by BRE with the funding and support of the Sustainable Energy Policy Division of the Department for Environment, Food and Rural Affairs (Defra) through a contract managed by the Energy Saving Trust. This publication is Crown Copyright. For any further information please contact [environment@bre.co.uk](mailto:environment@bre.co.uk)*

© Crown Copyright. 2006.

## Thermal Insulation 2003

### Executive Summary

68% of the housing stock (14.7 million dwellings) have predominantly cavity walls and 30% (6.5 million dwellings) have predominantly solid masonry walls while the remaining dwellings are constructed of other materials. There are 5.3 million dwellings with cavity wall insulation; this represents 36% of stock with cavity walls.

Of all dwellings with a loft space, 4% have no loft insulation, 62% have loft insulation of depths upto 100mm, 30% have insulation of depths from 101 – 200mm and 4% have over 200mm, indicating a strong potential for upgrades to a very high level of insulation.

Approximately 82% (17.6 million) of dwellings have some level of double glazing. 53.3% of stock have the entire dwelling double glazed, whilst 10% have less than half of the windows double glazed.

The extent of thermal insulation measures in a property depends greatly on the type and age of the dwelling. Generally, the older the dwelling, the poorer the thermal insulation measures. Cavity wall insulation, double glazing and the thickest loft insulation all follow the trend of increasing in proportion as building age decreases. Converted flats generally have the least thermal insulation measures when looking at building type, whilst detached dwellings have the best measures, which may be attributed to the generally older age of converted flat stock compared to younger detached dwellings.

Private rented properties have the poorest thermal insulation measures when looking at all tenures. They have the lowest levels of entire household double glazing (36%), lowest levels of loft insulation (only 10% having more than 150mm of insulation), and the lowest levels of cavity wall insulation (28% of those dwellings with cavity walls).

Thermal insulation measures in dwellings generally improved from 2001 to 2003. Entire household double glazing and the thickest loft insulation categories have both shown positive changes across the whole stock. Entire household double glazing has increased from 51% in 2001 to 53% in 2003. Loft insulation >150mm has increased from 8% of dwellings in 2001 to 12% in 2003.

## 2003 Thermal Insulation Update Report

### Summary

- The extent of thermal insulation measures in a property depends greatly on the type and age of the dwelling.
- Private rented properties generally have poor thermal insulation measures.
- Presence of one thermal insulation measure makes it more likely that others are installed.
- Thermal insulation measures in dwellings generally increased from 2001 to 2003.

### Introduction

This report examines thermal insulation measures within the housing stock in 2003 as observed by the English House Condition Survey (EHCS). It is based upon a sample of approximately 16,500 dwellings. Cavity wall insulation, loft insulation and double glazing are examined in detail and the levels of these three measures are analysed using a number of dwelling and household variables. Temporal analysis is also undertaken incorporating data from the 1996 and 2001 EHCS.

Most new housing is now fitted with cavity wall insulation, effective loft insulation and full double glazing as standard. Increasingly, older housing is being renovated and upgraded to include these measures. This is being encouraged by the availability of grant schemes, incentives and potential money saving opportunities through government, energy suppliers and other private companies, as well as a higher awareness of energy efficiency among the general public.

68% of the housing stock (14.7 million dwellings) has predominantly cavity walls and 30% (6.5 million dwellings) have predominantly solid masonry walls (figure 1). There are 5.3 million dwellings with cavity wall insulation; this represents 36% of stock with cavity walls, and 25% of all stock, leaving 9.4 million dwellings with uninsulated cavity walls.

Of all dwellings with a loft space, 48% have loft insulation of depth 51-100mm, 4% have over 200mm and 4% have no loft insulation (figure 2).

Approximately 81% (17.4 million) of dwellings have some level of double glazing. 56% of stock has the entire dwelling double glazed, whilst 16% have less than half of the windows double glazed (figure 3).

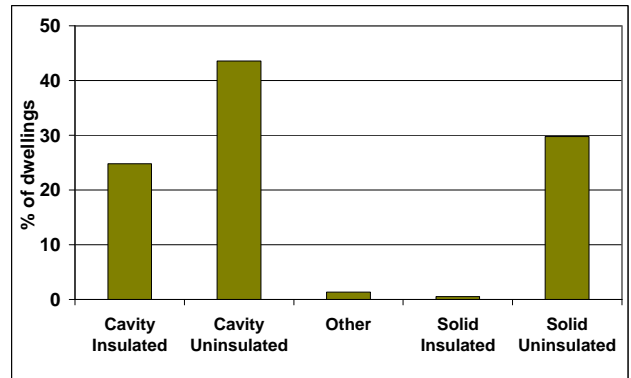


Figure 1: Distribution of wall type

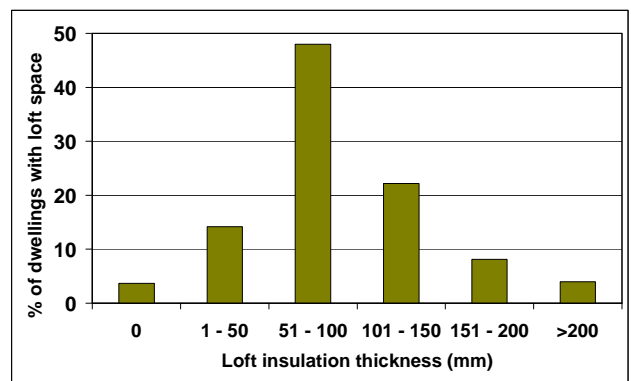


Figure 2: Distribution of loft insulation thickness

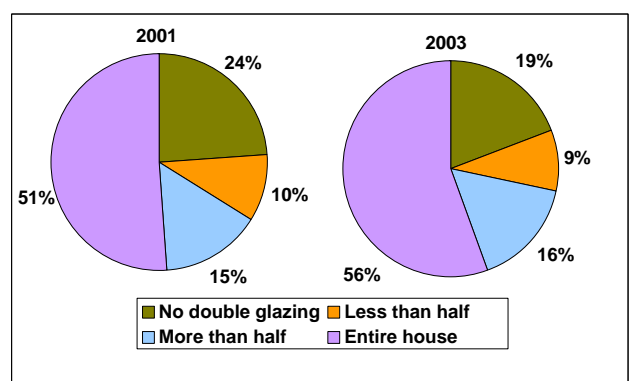


Figure 3: Distribution of double glazing comparing 2001 to 2003

## Dwelling Analysis

### Wall Type

There is a strong correlation between age of dwelling and wall construction type, reflecting changes in building practices and regulations over time. 85% (3.8 million) of pre 1919 homes are of solid wall construction, compared to only 1% of post 1980 dwellings which are predominantly built with cavity walls (figure 4).

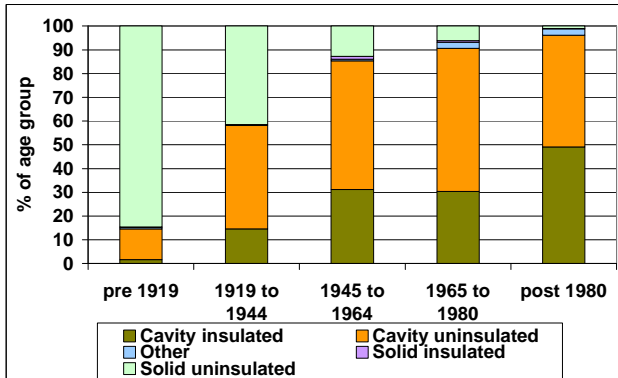


Figure 4: Distribution of wall type with dwelling age

The type of dwelling has a strong influence on wall type. A high proportion (83%) of converted flats are of solid wall construction, reflecting the predominant age of this dwelling type (83% are pre 1919). This compares to typically younger purpose built flats and detached houses (77% of detached houses and 86% of purpose built flats are post 1945) which are more likely to have cavity walls (75% and 76% respectively) (figure 5).

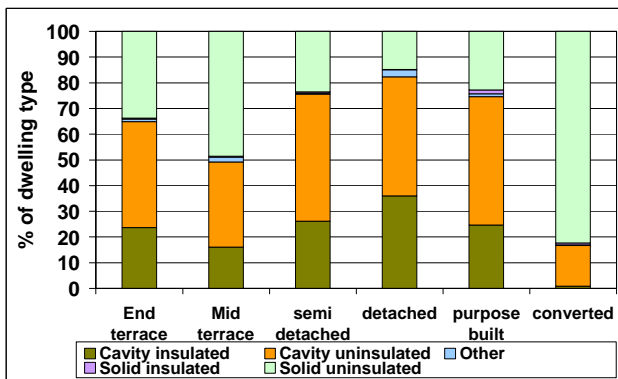


Figure 5: Distribution of wall type with dwelling type

There is regional variation in wall type across England. Most noticeably, London has 63% solid wall dwellings, more than double the proportion in most other Government Office Regions (GORs). The region with the highest proportion of cavity walls is the North East (82%). The remaining regions range from 20% – 32% solid walls, and 67% – 78% cavity walls. The clear anomaly of

London may be explained by the high proportion of older stock in this region (60% of London stock is pre 1919, compared to 40% average elsewhere).

### Cavity Wall Insulation

Modern construction methods result in newer dwellings being more likely to have Cavity Wall Insulation (CWI). 51% of post 1980 houses with external cavity walls have CWI, compared to only 12% of pre 1919 houses (figure 6). The only anomaly in this trend is the 1965-1980 group at 34% (3% less than 1945-1964).

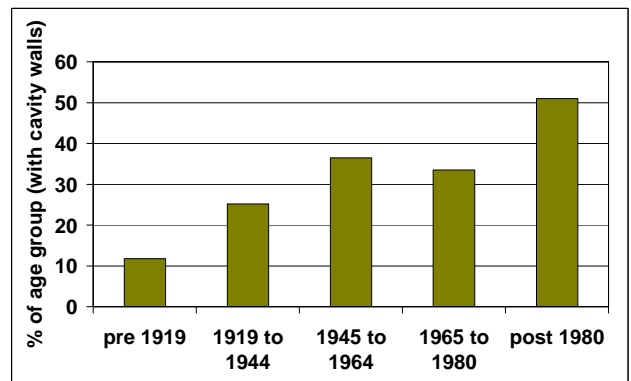


Figure 6: Percentage of dwellings with cavity walls having CWI by dwelling age

There are significant variations in the amount of CWI by dwelling type. This is related to the age of the building, and the tenure. Of those dwellings with cavity walls, the highest proportion of CWI is found in detached properties (44%) which is related to the age of these properties. Cavity wall insulation is lowest in converted flats (5% [of those with cavities, i.e. 95% empty]) reflecting the older average age of these dwellings (83% of converted flats are pre 1919, making them predominantly solid walled), and the high level of private rented dwellings in this group (47% of converted flats) (figure 7).

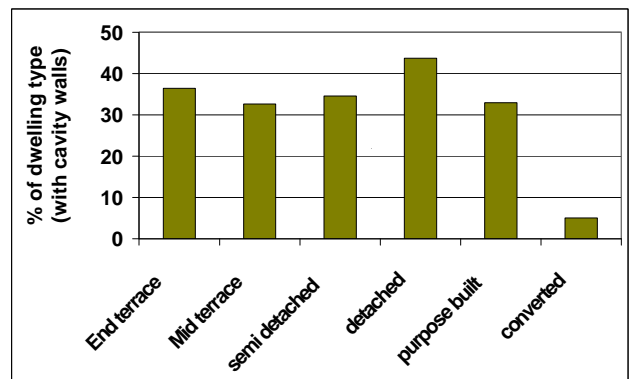


Figure 7: Percentage of dwellings with cavity walls having CWI by dwelling type

When considering only those dwellings with cavity walls, there are clear regional differences in whether CWI is present. In particular there is a strong east-west divide where CWI is more prevalent in eastern than western GORs. This may be attributed to the tenure and age profiles of the stock in these regions. When considering only those dwellings with cavity walls, the North East and Yorkshire & Humberside GORs have a high level of RSL and local authority dwellings (both 23%), which (as described below) are more likely to have good thermal insulation measures. Younger buildings are also more likely to have CWI and the eastern regions tend to have younger housing – 60% of the Eastern GOR with cavity walls are post 1965, as are 58% of East Midlands GOR and 56% of the South East GOR. The east-west trend may also be related to regional schemes for installing thermal insulation measures, with regions taking up different strategies depending on stock and climatic conditions.

### Loft Insulation

9% of pre 1919 stock with loft space has no loft insulation. This proportion drops as building age decreases, to less than 1% of post 1980 dwellings (figure 8), reflecting standard installation of loft insulation in newer housing. Perhaps surprisingly all age bands show close to 4% of stock with >200mm loft insulation. However, older dwellings are less likely to have >150mm loft insulation (10% of pre 1919 dwellings compared to 13% of 1945-1964 and 16% of post 1980).

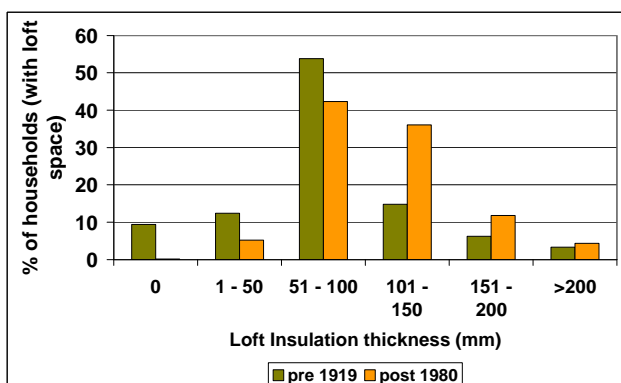


Figure 8: Distribution of loft insulation for oldest and newest dwelling categories (of dwellings with loft space)

Purpose built flats with a loft space (i.e. top floor flats) are the most likely dwelling type to have more than 200mm of insulation (13%), and least likely to have no loft insulation (1%). Converted flats and mid terrace dwellings both have the highest incidence of no loft insulation (6%).

Dwellings with double glazing are more likely to have thicker loft insulation. Looking only at dwellings with a loft space, 5% of dwellings with full double glazing have more than 200mm loft insulation, compared to 4% of the stock with no double glazing. Similarly, only 2% of houses with full double glazing have no loft insulation, whereas 7% of those with no double glazing also have no loft insulation. This trend may be explained by younger houses being more likely to have these two measures installed during construction. It is also possible that if a property is retrofitted with one insulation measure, it is more likely to have others installed.

Dwellings in the northern GORs (including the North East, North West and Yorkshire & Humberside) and the South East (including London, East Anglia and the South East) are more likely to have >200mm loft insulation than any other region. The Midlands and the South West GORs have the lowest proportion of dwellings with >200mm of loft insulation (figure 9). This trend may be due to climatic differences, proportions of social stock, age of dwelling and affluence in these areas. London has a considerably higher proportion of dwellings with no insulation (7%), nearly double the average percentage for any other group, contributing to the high South East figure, which may be attributed to the higher number of private rented dwellings, and the considerably older stock in this GOR (figure 9).

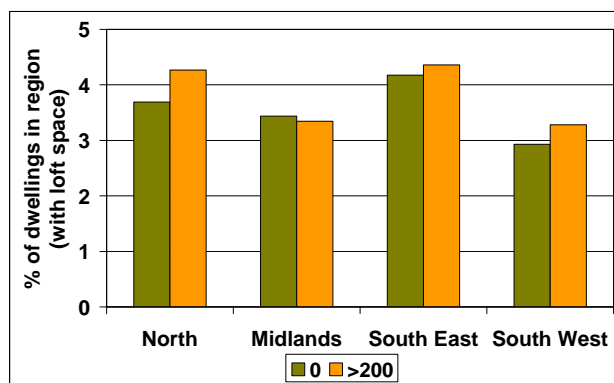


Figure 9: Distribution of dwellings with none or >200mm loft insulation by region (South East is London, East Anglia and South East GORs; South West is South West GOR; North includes North East, North West and Yorkshire & Humberside GORs; Midlands includes East and West Midlands GORs)

### Double Glazing

There is a correlation between the extent of double glazing and dwelling age across the housing stock. A high percentage of pre 1919 dwellings (35%) have no double glazing, compared to an average of 15% for all post 1919 dwellings. There is a steady increase in percentage of dwellings with double glazing in the entire dwelling in

younger properties. 32% of pre 1919 dwellings have full double glazing, compared to 60% of 1945-1964, and 77% of post 1980 stock (figure 10). These trends reflect changing building practices (most houses are now constructed using double glazed units as standard), and the retrofitting of other dwellings with double glazing.

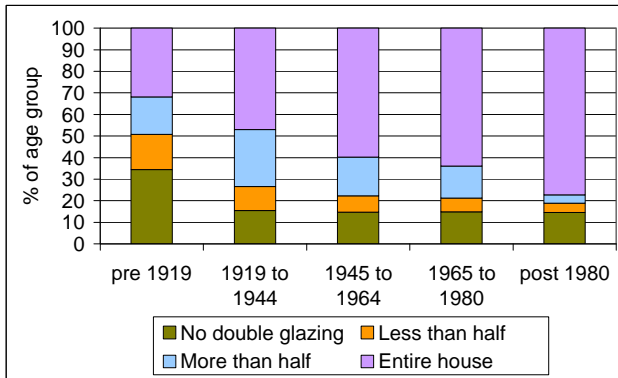


Figure 10: Extent of double glazing by dwelling age

The type of dwelling also influences the amount of double glazing. Noticeably, a high number of converted flats (50%) have no double glazing while relatively few have entire-dwelling double glazing (25%). These patterns reflect the older average age of the stock and the high levels of private rented dwellings in this property type. Only 12% of detached and semi detached dwellings have no double glazing. The highest levels of entire-dwelling double glazing are in detached houses (60%) and purpose built flats (61%), which is related to the younger age of this stock.

London has the highest incidence of dwellings without any double glazing (31%) and the lowest proportion of dwellings entirely double glazed (44% compared to 56% average over whole population). This reflects the older stock present in this area and the high proportion of private rented dwellings (over double the proportion of any other region).

## Household Analysis

### Tenure

Local authority and RSL dwellings have the highest levels of insulation in the stock. CWI is found in 42% of local authority and 43% of RSL dwellings with cavity walls (figure 11). RSL stock also has the highest proportion of entire dwelling double glazing (69%) (table 1). Of those dwellings with a loft space, the highest levels of loft insulation (>200mm) tend to be found in RSL and local authority dwellings (7% and 8% of these sectors respectively). These tenures also show a low percentage

of dwellings with no loft insulation (local authority 2%, RSL 1%) (figure 12).

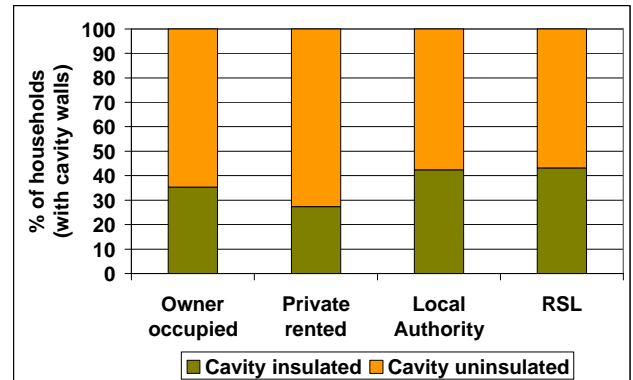


Figure 11: Cavity wall insulation by tenure

Private rented dwellings have the lowest levels of insulation. Only 27% of cavity walls have CWI and 38% of this tenure have full double glazing.

Tenure	No double glazing (%)	Less than half (%)	More than half (%)	Entire house (%)
Owner occupied	14	10	20	57
Private rented	39	12	11	38
Local Authority	33	8	7	52
RSL	22	5	6	69

Table 1: Percentage of dwellings with levels of double glazing by tenure

These patterns reflect the typical physical characteristics of the different tenure types. Most notably, 70% of RSL stock were built after 1965, and 42% after 1980, which can account for the high level of thermal insulation measures installed. Local authorities and RSLs may have a rolling upgrade program for their stock, which will act to keep thermal insulation levels higher in older stock. Private rented dwellings, as outlined in an earlier section, may be less likely to be upgraded and maintained by landlords.

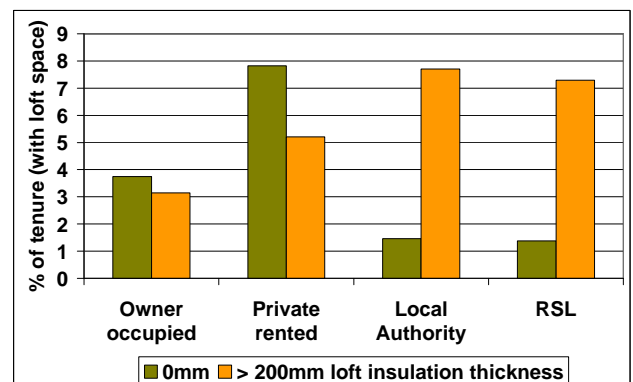


Figure 12: Loft insulation thickness by tenure (of dwellings with loft space)



### Rural / Urban Analysis

The nature of the surrounding neighbourhood can give an indication of the extent of thermal insulation measures. Entire house double glazing is highest in rural residential<sup>1</sup> dwellings (63%) and lowest in city centre<sup>2</sup> stock (39%) (figure 13).

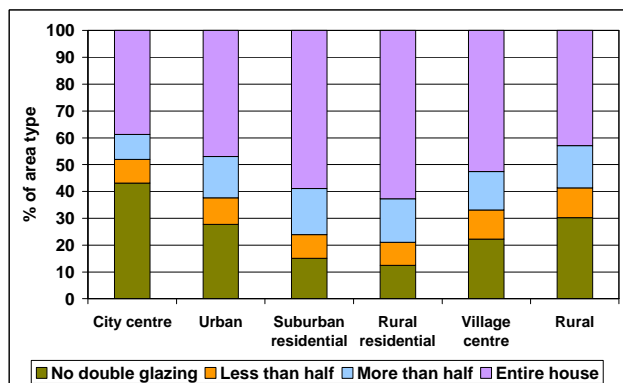


Figure 13: Extent of double glazing by rural/urban location

When considering all stock with cavity walls, cavity wall insulation is lowest in urban areas<sup>3</sup> (30%) and again the highest levels are found in rural residential (33%) stock (figure 14).

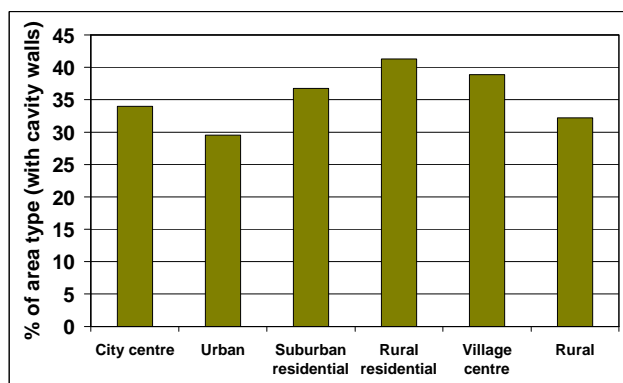


Figure 14: Extent of cavity wall insulation by rural/urban location

Only 3% of rural residential and suburban residential<sup>4</sup> stock with loft space have no insulation. The thinnest loft insulation is found in rural<sup>5</sup> dwellings where 7% have no insulation and 2% have greater than 200mm, compared to 8% of city centre dwellings which have >200mm (table 2).

<sup>1</sup> The suburban areas of villages, often meeting the housing needs of people who work in nearby towns and villages

<sup>2</sup> The area immediately surrounding the core of large cities

<sup>3</sup> Around core of towns, small cities, older urban areas incorporated in metropolis

<sup>4</sup> The outer area of a town or city

<sup>5</sup> Isolated dwellings, small hamlets

The low levels of insulation in city centres can partly be explained by these zones being generally older (46% of city centre dwellings are pre 1919). Conversely, 74% of rural residential dwellings were built after 1945, and have higher levels of thermal insulation which reflects this. In addition, 21% of city centre dwellings are in the private rented tenure (compared to just 7% of rural residential dwellings) which is reflected in the lower levels of insulation.

	% of loft insulation thickness			
	0	1 - 100	101 - 200	>200
City centre	6	56	30	8
Urban	6	61	29	4
Suburban residential	3	64	30	4
Rural residential	3	59	33	4
Village centre	5	60	32	4
Rural	7	66	24	2

Table 2: Loft insulation thickness by rural/urban location

### Household Type

Thermal insulation measures vary depending on the type of household. Particularly noticeable is that multi-person households have the lowest proportion of full double glazing and cavity wall insulation (49% and 18% of all stock respectively). This group also inhabits stock with a low proportion of loft insulation >200mm (3% of dwellings with a loft space).

The highest proportion of households with CWI (of cavity walled dwellings) is found in the over 60 age groups ('one person over 60' at 40% and 'couple over 60' at 41%). The lowest proportion of CWI is found in the 'one person under 60' category (31%). 36% of couples with dependent children have CWI, as do a similar proportion of single parents with dependent children.

Multi-person households are the least likely group to have greater than 200mm of loft insulation (around 3%). Single person households are most likely to have this thickness of insulation (5%) (figure 15).



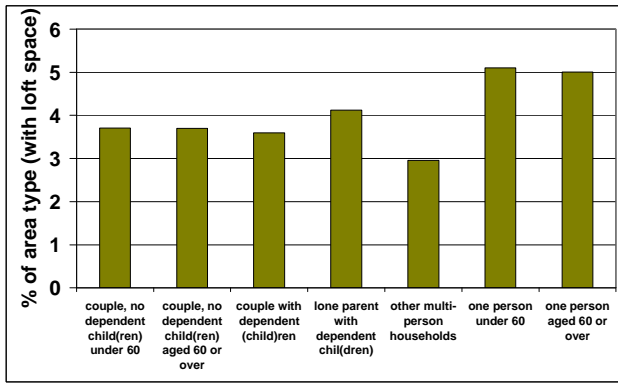


Figure 15: Percentage of household type with >200mm loft insulation

Households with couples are more likely to have full double glazing at 58% compared to 54% of one adult households (including lone parents) and 48% of multi-person households (figure 16).

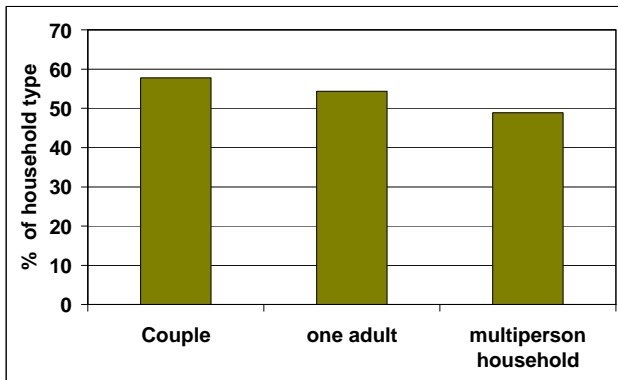


Figure 16: Percentage of household type with entire household double glazing

Household Reference Person (HRP) Age

Cavity wall insulation levels rise steadily as Household Reference Person (HRP) age increases; from 30% of those dwellings with cavity walls for 16-24 year olds, to 40% of households with an HRP 65 or over (figure 17).

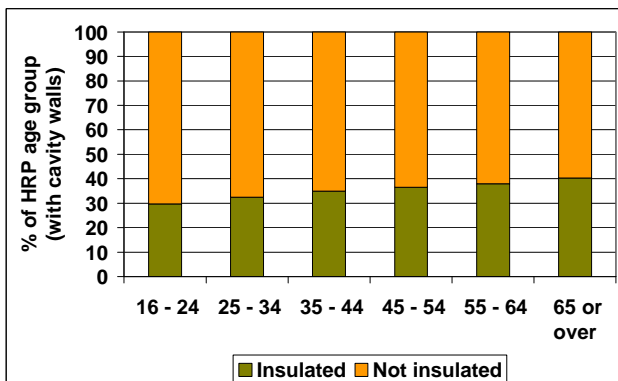


Figure 17: Insulation of cavity walls by age of HRP

Age of HRP does not seem to relate to the proportion of dwellings with entire household double glazing. All categories are close to the average, except for the 16-24 age group being the lowest at 50%. More striking is the proportion of the 16-24 age group with no double glazing (30%), whereas the 45-54 and 55-64 age groups both average 16% (table 3).

Age of HRP	No double glazing (%)	Less than half (%)	More than half (%)	Entire house (%)
16 - 24	30	10	10	50
25 - 34	23	9	13	56
35 - 44	17	9	17	57
45 - 54	16	10	18	56
55 - 64	16	9	18	56
65 +	19	9	17	56

Table 3: Extent of double glazing by HRP age

Households with an HRP aged 16-24 with a loft space are most likely to have no loft insulation at 7% but are also the most likely to have 200mm or more insulation (5%) although all age groups are very close in this category.

Household Income

Household income shows some interesting patterns relating to thermal insulation measures.

All income quintiles have close to the average level (56%) of full house double glazing. More households than average in the lowest income quintile have no double glazing (26% compared to an average of 18%), while fewer households in the highest income quintile have no double glazing (16%) (figure 18).

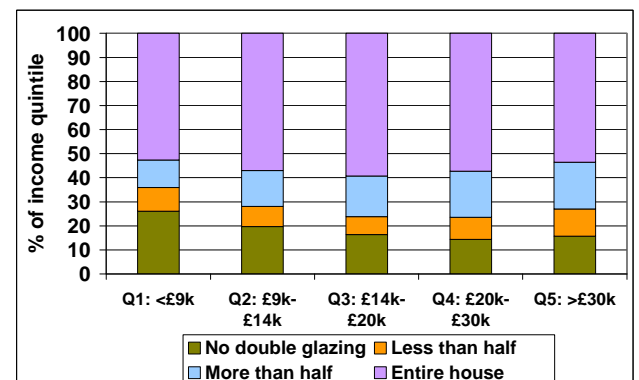


Figure 18: Extent of double glazing by income

As income increases, CWI (in those dwellings with cavity walls) decreases from 39% in the lowest income quintile to 34% in the 4<sup>th</sup> quintile, and then makes a jump up to 38% in the highest quintile (figure 19).

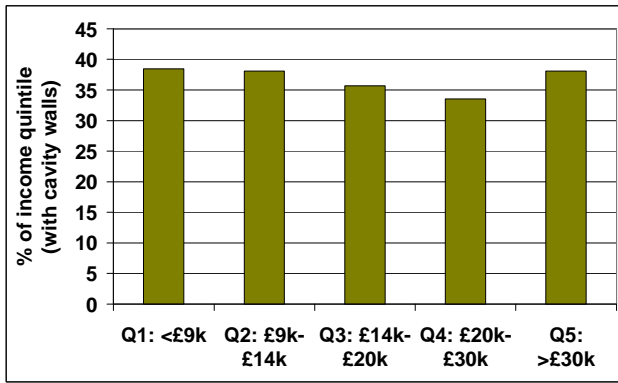


Figure 19: Cavity wall insulation by income

Generally, as income increases the proportion of >200mm loft insulation decreases from 5% in the lowest 20% of incomes to 3% in the highest. However, the lowest 20% also shows the highest proportion of no loft insulation (4%).

Some of these surprising trends may be attributed to a large proportion of stock in the lower quintiles being in the local authority or RSL tenures (78% of both RSL and local authority in the lowest two quintiles), and also uptake of means tested grants and schemes to implement these measures in lower income households.

### Comparison over time

The proportion of dwellings with double glazing has increased significantly since 1991. The percentage of entire household double glazing has increased from 25% in 1991 to 56% in 2003. Stock without any double glazing has decreased dramatically from 48% in 1991 to 18% in 2003 (figure 3). These changes show that older single glazed windows are being replaced with new double glazing, increasing levels of thermal insulation overall (figure 20).

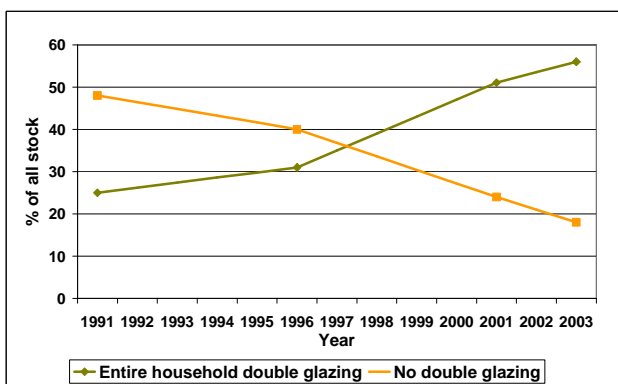


Figure 20: Percentage change in entire household double glazing 1991-2003

Increases in double glazing are observed across all tenures. The biggest rise since 1991 is observed in the

RSL tenure, from 22% of dwellings having some double glazing in 1991 to 79% in 2003. Private rented and local authority dwellings have also shown large increases – private rented from 21% in 1991 to 61% in 2003, and local authority from 21% in 1991 to 67% in 2003. The lower rate of increase in the owner occupied tenure (20%) can be attributed to the high overall percentage of stock with double glazing within these tenure types (86% of owner occupied stock in 2003 had some double glazing).

The lowest level of double glazing is found within dwellings constructed pre 1919. However, levels have increased substantially in this stock from 43% in 1991 to 66% in 2003. The potential increase in the future for this age group may be less than other younger dwellings. Issues relating to aesthetics, costs and planning may hold back this age group obtaining the highest levels of double glazing. This may be avoided by the development of new glazing techniques and products becoming available and affordable.

Double glazing is the most visible thermal insulation measure and therefore these strong positive trends may be attributed to householders being more likely to install this measure than other less visually obvious measures. Double glazing also has other benefits which may encourage installation (e.g. aesthetic, noise reduction and security benefits).

Overall, stock with no loft insulation (considering only those dwellings with loft space) has decreased from 7% in 1996, to 5% in 2001 and 4% in 2003. The proportion of dwellings with over 150mm loft insulation has increased from 3% in 1996 to 8% in 2001, 12% in 2003 (figure 21). The 2001 and 1996 EHCS surveys only looked at loft insulation in houses and bungalows – not top floor flats.

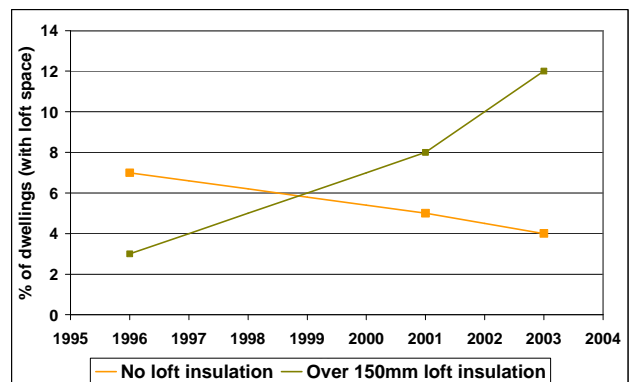


Figure 21: Percentage change in loft insulation 1996-2003

These positive trends are also evident in all tenures. The RSL and local authority tenures show the greatest increase in loft insulation greater than 150mm – both rising

15% from 1996 to 2003. Owner occupied and private rented properties both show a more modest increase of 8%. Conversely the levels of stock with no insulation are dropping, with the biggest falls in the private rented sector (16% in 1996 to 12% in 2001 and 8% in 2003). All other tenures are at much lower levels and have changed very slightly (owner occupied: fall from 5% in 1996 to 4% in 2003, RSL 2% in 1996 to 1% in 2003 with local authority staying the same at 2%).

Pre 1919 houses have shown a strong decline in dwellings with no insulation, from 20% in 1996 to 14% in 2001 and 9% in 2003. This age band has the highest levels of no insulation, and these relatively large changes reflect the larger potential to improve over time. There has also been a rise in insulation thicker than 150mm in pre 1919 dwellings, from 2% in 1996 to 7% in 2001 and 10% in 2003 suggesting retrofitting of loft insulation measures.

The changes outlined above reflect the retrofitting of older stock with loft insulation and replacing older single glazed windows with new double glazing, increasing thermal insulation overall. New stock typically has these insulation measures installed as standard.

Nationally, levels of CWI (in dwellings with cavity walls) have increased from around 12% in 1991 to approximately 22% in 1996, and 36% in 2001. There was a slight increase in the number of dwellings with CWI between 2001 and 2003, although the percentage of dwellings with CWI remains at around 36%.<sup>6</sup>

When looking at tenure, the proportion of local authority and RSL dwellings with CWI have increased from 10% in 1991 to 22% in 1996, 36% in 2001 and 42% in 2003. All other tenures show overall increases from 1991 to 2003 (owner occupied: 15% to 35%, RSL: 10% to 43%, private rented: 4% to 27%) but also all show a small drop from 2001 to 2003, ranging from 1-3%, again possibly due to an overestimate of 2001 figures.

London has shown the least change in cavity wall insulation since 1996 at 4%. Over the remainder of the country there is a trend of increasing change from south west to north east, where the biggest changes have been seen in the north east (19%) (figure 22).

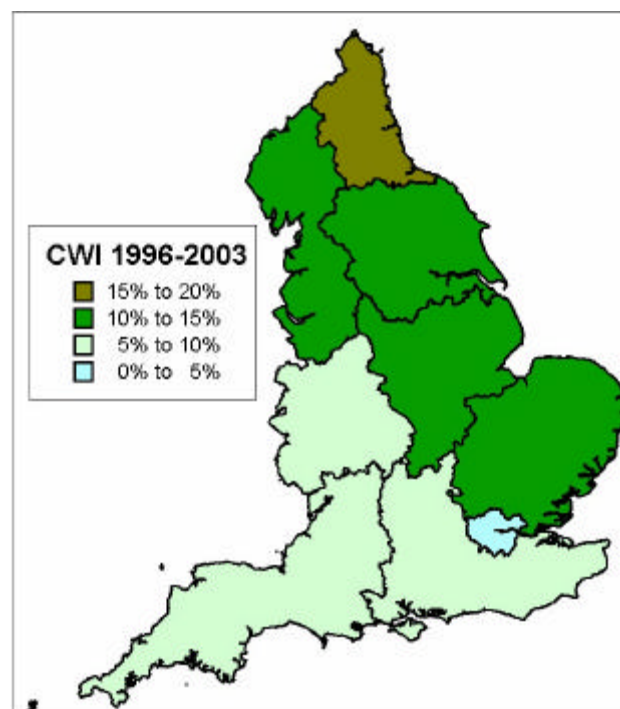


Figure 22: Percentage change in cavity wall insulation (in dwellings with cavity walls) within GORs

<sup>6</sup> Evidence from independent cumulative installation data and trend analysis suggests that the level of CWI may be overstated in 2001, and that national levels of CWI have in fact increased by around 2-3% between 2001 and 2003.

## Thermal Insulation Update Tables 2003

These tables give detailed breakdowns of the three main housing insulation groups (double glazing, cavity wall insulation and loft insulation) against key variables, as an appendix to the Thermal Insulation Update Report 2003.

### Index

Table 1.1 Double glazing - Proportion of dwelling double glazed

Table 1.2 Double glazing - Proportion of dwelling double glazed by dwelling age

Table 1.3 Double glazing - Proportion of dwelling double glazed by dwelling type

Table 1.4 Double glazing - Proportion of dwelling double glazed by dwelling tenure

Table 1.5 Double glazing - Proportion of dwelling double glazed by household composition

Table 1.6 Double glazing - Proportion of dwelling double glazed by household income quintiles

Table 2.1 Loft insulation - Thickness of loft insulation

Table 2.2 Loft insulation - Thickness of loft insulation by dwelling age

Table 2.3 Loft insulation - Thickness of loft insulation by dwelling type

Table 2.4 Loft insulation - Thickness of loft insulation by dwelling tenure

Table 2.5 Loft insulation - Thickness of loft insulation by household composition

Table 2.6 Loft insulation - Thickness of loft insulation by household income quintiles

Table 3.1 Cavity wall insulation - Proportion of cavity wall dwellings with cavity wall insulation

Table 3.2 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by dwelling age

Table 3.3 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by dwelling type

Table 3.4 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by dwelling tenure

Table 3.5 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by household composition

Table 3.5 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by household income quintiles

**Table 1.1 Double glazing - Proportion of dwelling double glazed**

	count (000s), (column%)
<b>Double glazing present?</b>	<b>Dwellings</b>
No double glazing	3,858 ( 18.0)
Less than half	2,045 ( 9.5)
More than half	4,130 ( 19.2)
Entire house	11,451 ( 53.3)
Total	21,484 ( 100.0)

Table 1.2 Double glazing - Proportion of dwelling double glazed by dwelling age

	count(000s), (row%), (column%)				
	No double glazing	Less than half	More than half	Entire house	Total
pre 1919	1,538 ( 33.8) ( 39.9)	711 ( 15.7) ( 34.8)	897 ( 19.7) ( 21.7)	1,398 ( 30.8) ( 12.2)	4,544 ( 100.0) ( 21.1)
1919 - 1944	593 ( 14.9) ( 15.4)	419 ( 10.5) ( 20.5)	1,110 ( 27.9) ( 26.9)	1,860 ( 46.7) ( 16.2)	3,981 ( 100.0) ( 18.5)
1945 - 1964	631 ( 14.2) ( 16.4)	328 ( 7.4) ( 16.0)	870 ( 19.6) ( 21.1)	2,610 ( 58.8) ( 22.8)	4,439 ( 100.0) ( 20.7)
1965 - 1980	624 ( 13.1) ( 16.2)	374 ( 7.9) ( 18.3)	872 ( 18.4) ( 21.1)	2,882 ( 60.7) ( 25.2)	4,752 ( 100.0) ( 22.1)
1981 - 1990	346 ( 17.9) ( 9.0)	182 ( 9.4) ( 8.9)	232 ( 11.9) ( 5.6)	1,180 ( 60.8) ( 10.3)	1,940 ( 100.0) ( 9.0)
post 1990	127 ( 6.9) ( 3.3)	32 ( 1.7) ( 1.6)	150 ( 8.2) ( 3.6)	1,520 ( 83.1) ( 13.3)	1,829 ( 100.0) ( 8.5)
Total	3,858 ( 18.0) ( 100.0)	2,045 ( 9.5) ( 100.0)	4,130 ( 19.2) ( 100.0)	11,451 ( 53.3) ( 100.0)	21,484 ( 100.0) ( 100.0)

Table 1.3 Double glazing - Proportion of dwelling double glazed by dwelling type

	count(000s), (row%), (column%)				
	No double glazing	Less than half	More than half	Entire house	Total
End terrace	370 ( 17.9)	215 ( 10.4)	358 ( 17.3)	1,124 ( 54.4)	2,067 ( 100.0)
Mid terrace	986 ( 22.2)	461 ( 10.4)	764 ( 17.2)	2,235 ( 50.3)	4,445 ( 100.0)
Semi detached	794 ( 25.6)	573 ( 22.5)	1,525 ( 18.5)	3,695 ( 19.5)	6,586 ( 20.7)
Detached	794 ( 12.1)	573 ( 8.7)	1,525 ( 23.2)	3,695 ( 56.1)	6,586 ( 100.0)
Purpose built	552 ( 20.6)	394 ( 28.0)	874 ( 36.9)	2,754 ( 32.3)	4,573 ( 30.7)
Converted & non-residential	552 ( 12.1)	394 ( 8.6)	874 ( 19.1)	2,754 ( 60.2)	4,573 ( 100.0)
	802 ( 14.3)	294 ( 19.3)	508 ( 21.2)	1,485 ( 24.0)	3,089 ( 21.3)
	802 ( 26.0)	294 ( 9.5)	508 ( 16.5)	1,485 ( 48.1)	3,089 ( 100.0)
	354 ( 20.8)	110 ( 14.4)	100 ( 12.3)	159 ( 13.0)	723 ( 14.4)
	354 ( 49.0)	110 ( 15.2)	100 ( 13.9)	159 ( 22.0)	723 ( 100.0)
	354 ( 9.2)	110 ( 5.4)	100 ( 2.4)	159 ( 1.4)	723 ( 3.4)
Total	3,858 ( 18.0)	2,045 ( 9.5)	4,130 ( 19.2)	11,451 ( 53.3)	21,484 ( 100.0)
	3,858 ( 100.0)	2,045 ( 100.0)	4,130 ( 100.0)	11,451 ( 100.0)	21,484 ( 100.0)



Table 1.4 Double glazing - Proportion of dwelling double glazed by dwelling tenure

	count(000s), (row%), (column%)				
	No double glazing	Less than half	More than half	Entire house	Total
Owner occupied	2,012 ( 13.2) ( 52.1)	1,372 ( 9.0) ( 67.1)	3,294 ( 21.7) ( 79.8)	8,523 ( 56.1) ( 74.4)	15,201 ( 100.0) ( 70.8)
Private rented	804 ( 36.5) ( 20.8)	294 ( 13.3) ( 14.4)	319 ( 14.5) ( 7.7)	788 ( 35.7) ( 6.9)	2,205 ( 100.0) ( 10.3)
Local Authority	740 ( 30.1) ( 19.2)	262 ( 10.7) ( 12.8)	288 ( 11.7) ( 7.0)	1,167 ( 47.5) ( 10.2)	2,457 ( 100.0) ( 11.4)
RSL	302 ( 18.6) ( 7.8)	116 ( 7.2) ( 5.7)	229 ( 14.2) ( 5.6)	973 ( 60.0) ( 8.5)	1,621 ( 100.0) ( 7.5)
Total	3,858 ( 18.0) ( 100.0)	2,045 ( 9.5) ( 100.0)	4,130 ( 19.2) ( 100.0)	11,451 ( 53.3) ( 100.0)	21,484 ( 100.0) ( 100.0)

**Table 1.5 Double glazing - Proportion of dwelling double glazed by household composition**

	count(000s), (row%), (column%)				
	<b>No double glazing</b>	<b>Less than half</b>	<b>More than half</b>	<b>Entire house</b>	<b>Total</b>
couple under 60	574 ( 14.3) ( 16.0)	364 ( 9.1) ( 18.6)	822 ( 20.5) ( 20.6)	2,251 ( 56.1) ( 20.3)	4,012 ( 100.0) ( 19.4)
couple 60 or over	438 ( 13.8) ( 12.2)	264 ( 8.3) ( 13.5)	701 ( 22.1) ( 17.6)	1,776 ( 55.9) ( 16.0)	3,178 ( 100.0) ( 15.4)
couple with children	685 ( 13.8) ( 19.1)	456 ( 9.2) ( 23.3)	934 ( 18.8) ( 23.4)	2,883 ( 58.1) ( 25.9)	4,959 ( 100.0) ( 24.0)
lone parent with children	343 ( 22.8) ( 9.6)	136 ( 9.0) ( 6.9)	253 ( 16.8) ( 6.3)	771 ( 51.3) ( 6.9)	1,503 ( 100.0) ( 7.3)
large adult household	329 ( 22.7) ( 9.2)	172 ( 11.9) ( 8.8)	257 ( 17.8) ( 6.5)	689 ( 47.6) ( 6.2)	1,447 ( 100.0) ( 7.0)
one person under 60	627 ( 23.8) ( 17.5)	280 ( 10.6) ( 14.3)	436 ( 16.6) ( 11.0)	1,292 ( 49.0) ( 11.6)	2,636 ( 100.0) ( 12.8)
one person 60 or over	589 ( 20.2) ( 16.4)	289 ( 9.9) ( 14.7)	582 ( 20.0) ( 14.6)	1,454 ( 49.9) ( 13.1)	2,914 ( 100.0) ( 14.1)
<b>Total</b>	<b>3,586</b> ( 17.4) ( 100.0)	<b>1,961</b> ( 9.5) ( 100.0)	<b>3,985</b> ( 19.3) ( 100.0)	<b>11,116</b> ( 53.8) ( 100.0)	<b>20,648</b> ( 100.0) ( 100.0)

Table 1.6 Double glazing - Proportion of dwelling double glazed by household income quintiles

	count(000s), (row%), (column%)				
	No double glazing	Less than half	More than half	Entire house	Total
1st quintile	1,068 ( 26.1)	402 ( 9.8)	471 ( 11.5)	2,153 ( 52.6)	4,093 ( 100.0)
2nd quintile	810 ( 19.7)	344 ( 8.4)	614 ( 14.9)	2,350 ( 57.1)	4,119 ( 100.0)
3rd quintile	678 ( 16.4)	305 ( 7.4)	699 ( 16.9)	2,444 ( 59.2)	4,126 ( 100.0)
4th quintile	595 ( 14.3)	386 ( 9.3)	791 ( 19.0)	2,382 ( 57.3)	4,155 ( 100.0)
5th quintile	651 ( 15.7)	470 ( 11.3)	811 ( 19.5)	2,224 ( 53.5)	4,155 ( 100.0)
Total	3,802 ( 18.4)	1,906 ( 9.2)	3,387 ( 16.4)	11,553 ( 56.0)	20,648 ( 100.0)
	( 100.0)	( 100.0)	( 100.0)	( 100.0)	( 100.0)

**Table 2.1 Loft insulation - Thickness of loft insulation**

<b>Loft insulation thickness</b>	<b>count(000s), (column%)</b>	<b>Dwellings</b>
None		720 ( 3.7)
1 - 50		2,726 ( 14.2)
51 - 100		9,216 ( 48.0)
101 - 150		4,222 ( 22.0)
151 - 200		1,539 ( 8.0)
Over 200		770 ( 4.0)
<b>Total</b>		<b>19,193</b> <b>( 100.0)</b>

(of all dwellings with loft space)

Table 2.2 Loft insulation - Thickness of loft insulation by dwelling age

	count(000s), (row%), (column%)						
	None	1 - 50	51 - 100	101 - 150	151 - 200	> 200	Total
pre 1919	384 ( 9.4) ( 53.4)	508 ( 12.4) ( 18.6)	2,201 ( 53.8) ( 23.9)	606 ( 14.8) ( 14.4)	257 ( 6.3) ( 16.7)	136 ( 3.3) ( 17.7)	4,092 ( 100.0) ( 21.3)
1919 - 1944	195 ( 5.1) ( 27.1)	622 ( 16.4) ( 22.8)	1,838 ( 48.4) ( 19.9)	734 ( 19.3) ( 17.4)	289 ( 7.6) ( 18.8)	122 ( 3.2) ( 15.8)	3,800 ( 100.0) ( 19.8)
1945 - 1964	90 ( 2.3) ( 12.5)	632 ( 15.9) ( 23.2)	1,898 ( 47.8) ( 20.6)	840 ( 21.1) ( 19.9)	339 ( 8.5) ( 22.0)	174 ( 4.4) ( 22.6)	3,972 ( 100.0) ( 20.7)
1965 - 1980	44 ( 1.1) ( 6.2)	793 ( 19.6) ( 29.1)	1,889 ( 46.7) ( 20.5)	858 ( 21.2) ( 20.3)	267 ( 6.6) ( 17.3)	196 ( 4.8) ( 25.4)	4,046 ( 100.0) ( 21.1)
1981 - 1990	2 ( 0.1) ( 0.3)	130 ( 7.8) ( 4.8)	916 ( 54.7) ( 9.9)	478 ( 28.5) ( 11.3)	94 ( 5.6) ( 6.1)	54 ( 3.3) ( 7.1)	1,675 ( 100.0) ( 8.7)
post 1990	3 ( 0.2) ( 0.4)	41 ( 2.5) ( 1.5)	475 ( 29.5) ( 5.2)	707 ( 44.0) ( 16.7)	293 ( 18.3) ( 19.1)	88 ( 5.5) ( 11.5)	1,607 ( 100.0) ( 8.4)
Total	720 ( 3.7) ( 100.0)	2,726 ( 14.2) ( 100.0)	9,216 ( 48.0) ( 100.0)	4,222 ( 22.0) ( 100.0)	1,539 ( 8.0) ( 100.0)	770 ( 4.0) ( 100.0)	19,193 ( 100.0) ( 100.0)

(of all dwellings with loft space)

**Table 2.3 Loft insulation - Thickness of loft insulation by dwelling type**

	count(000s), (row%), (column%)						
	None	1 - 50	51 - 100	101 - 150	151 - 200	> 200	Total
End terrace	86 ( 4.2) ( 12.0)	278 ( 13.5) ( 10.2)	1,010 ( 48.9) ( 11.0)	428 ( 20.7) ( 10.1)	184 ( 8.9) ( 11.9)	81 ( 3.9) ( 10.5)	2,067 ( 100.0) ( 10.8)
Mid terrace	263 ( 5.9) ( 36.5)	649 ( 14.6) ( 23.8)	2,186 ( 49.2) ( 23.7)	844 ( 19.0) ( 20.0)	356 ( 8.0) ( 23.1)	148 ( 3.3) ( 19.2)	4,445 ( 100.0) ( 23.2)
Semi detached	211 ( 3.2) ( 29.4)	1,088 ( 16.5) ( 39.9)	3,198 ( 48.5) ( 34.7)	1,332 ( 20.2) ( 31.6)	558 ( 8.5) ( 36.3)	199 ( 3.0) ( 25.8)	6,586 ( 100.0) ( 34.3)
Detached	127 ( 2.8) ( 17.6)	635 ( 13.9) ( 23.3)	2,197 ( 48.0) ( 23.8)	1,047 ( 22.9) ( 24.8)	391 ( 8.6) ( 25.4)	176 ( 3.8) ( 22.9)	4,573 ( 100.0) ( 23.8)
Purpose built	13 ( 1.1) ( 1.8)	56 ( 4.7) ( 2.0)	393 ( 33.0) ( 4.3)	531 ( 44.7) ( 12.6)	47 ( 3.9) ( 3.0)	150 ( 12.6) ( 19.5)	1,190 ( 100.0) ( 6.2)
Converted & non-residential	20 ( 6.1) ( 2.8)	20 ( 6.0) ( 0.7)	232 ( 70.0) ( 2.5)	39 ( 11.8) ( 0.9)	3 ( 1.0) ( 0.2)	17 ( 5.1) ( 2.2)	331 ( 100.0) ( 1.7)
Total	720 ( 3.7) ( 100.0)	2,726 ( 14.2) ( 100.0)	9,216 ( 48.0) ( 100.0)	4,222 ( 22.0) ( 100.0)	1,539 ( 8.0) ( 100.0)	770 ( 4.0) ( 100.0)	19,193 ( 100.0) ( 100.0)

(of all dwellings with loft space)

Table 2.4 Loft insulation - Thickness of loft insulation by dwelling tenure

	None	1 - 50	51 - 100	101 - 150	151 - 200	> 200	Total
Owner occupied	543 ( 3.7)	2,269 ( 15.7)	7,214 ( 49.8)	2,889 ( 19.9)	1,123 ( 7.7)	456 ( 3.1)	14,494 (100.0)
Private rented	134 ( 7.8)	220 ( 12.8)	959 ( 56.1)	234 ( 13.7)	74 ( 4.3)	89 ( 5.2)	1,710 (100.0)
Local Authority	26 ( 1.5)	155 ( 8.7)	636 ( 35.9)	625 ( 35.2)	195 ( 11.0)	137 ( 7.7)	1,773 (100.0)
RSL	17 ( 1.4)	83 ( 6.8)	406 ( 33.4)	474 ( 39.0)	148 ( 12.2)	89 ( 7.3)	1,216 (100.0)
Total	720 ( 3.7)	2,726 ( 14.2)	9,216 ( 48.0)	4,222 ( 22.0)	1,539 ( 8.0)	770 ( 4.0)	19,193 (100.0)

(of all dwellings with loft space)



**Table 2.5 Loft insulation - Thickness of loft insulation by household composition**

	count(000s), (row%), (column%)						
	None	1 - 50	51 - 100	101 - 150	151 - 200	> 200	Total
couple under 60	131 ( 3.5) ( 19.3)	562 ( 15.1) ( 21.4)	1,879 ( 50.4) ( 21.1)	764 ( 20.5) ( 18.6)	257 ( 6.9) ( 17.1)	138 ( 3.7) ( 18.8)	3,732 ( 100.0) ( 20.1)
couple 60 or over	75 ( 2.5) ( 11.1)	468 ( 15.6) ( 17.8)	1,487 ( 49.7) ( 16.7)	643 ( 21.5) ( 15.7)	210 ( 7.0) ( 14.0)	111 ( 3.7) ( 15.0)	2,994 ( 100.0) ( 16.2)
couple with children	176 ( 3.7) ( 25.9)	624 ( 13.1) ( 23.8)	2,312 ( 48.4) ( 26.0)	1,011 ( 21.2) ( 24.6)	484 ( 10.1) ( 32.3)	172 ( 3.6) ( 23.3)	4,778 ( 100.0) ( 25.8)
lone parent with children	43 ( 3.2) ( 6.3)	156 ( 11.9) ( 6.0)	593 ( 45.2) ( 6.7)	348 ( 26.5) ( 8.5)	118 ( 9.0) ( 7.9)	54 ( 4.1) ( 7.3)	1,313 ( 100.0) ( 7.1)
large adult household	70 ( 5.4) ( 10.3)	235 ( 18.1) ( 8.9)	599 ( 46.1) ( 6.7)	258 ( 19.8) ( 6.3)	100 ( 7.7) ( 6.7)	38 ( 3.0) ( 5.2)	1,300 ( 100.0) ( 7.0)
one person under 60	78 ( 3.7) ( 11.4)	247 ( 11.9) ( 9.4)	1,034 ( 49.9) ( 11.6)	465 ( 22.5) ( 11.3)	142 ( 6.8) ( 9.4)	106 ( 5.1) ( 14.3)	2,071 ( 100.0) ( 11.2)
one person 60 or over	106 ( 4.5) ( 15.6)	333 ( 14.2) ( 12.7)	984 ( 41.9) ( 11.1)	618 ( 26.4) ( 15.1)	188 ( 8.0) ( 12.5)	117 ( 5.0) ( 15.9)	2,346 ( 100.0) ( 12.7)
Total	679 ( 3.7) ( 100.0)	2,625 ( 14.2) ( 100.0)	8,887 ( 47.9) ( 100.0)	4,107 ( 22.2) ( 100.0)	1,499 ( 8.1) ( 100.0)	737 ( 4.0) ( 100.0)	18,534 ( 100.0) ( 100.0)

(of all dwellings with loft space)

**Table 2.6 Loft insulation - Thickness of loft insulation by household income quintiles**

	None	1 - 50	51 - 100	101 - 150	151 - 200	> 200	Total
1st quintile	147 ( 4.5) ( 21.6)	394 ( 12.1) ( 15.0)	1,411 ( 43.1) ( 15.9)	862 ( 26.4) ( 21.0)	290 ( 8.9) ( 19.4)	166 ( 5.1) ( 22.5)	3,271 ( 100.0) ( 17.7)
2nd quintile	150 ( 4.2) ( 22.1)	506 ( 14.0) ( 19.3)	1,643 ( 45.5) ( 18.5)	850 ( 23.5) ( 20.7)	287 ( 7.9) ( 19.2)	176 ( 4.9) ( 23.9)	3,613 ( 100.0) ( 19.5)
3rd quintile	112 ( 2.9) ( 16.4)	605 ( 15.9) ( 23.0)	1,847 ( 48.7) ( 20.8)	797 ( 21.0) ( 19.4)	291 ( 7.7) ( 19.4)	142 ( 3.7) ( 19.3)	3,793 ( 100.0) ( 20.5)
4th quintile	136 ( 3.5) ( 20.0)	583 ( 14.8) ( 22.2)	2,028 ( 51.7) ( 22.8)	765 ( 19.5) ( 18.6)	287 ( 7.3) ( 19.1)	128 ( 3.3) ( 17.3)	3,927 ( 100.0) ( 21.2)
5th quintile	135 ( 3.4) ( 19.8)	537 ( 13.7) ( 20.4)	1,958 ( 49.8) ( 22.0)	833 ( 21.2) ( 20.3)	344 ( 8.7) ( 22.9)	125 ( 3.2) ( 17.0)	3,930 ( 100.0) ( 21.2)
Total	679 ( 3.7) ( 100.0)	2,625 ( 14.2) ( 100.0)	8,887 ( 47.9) ( 100.0)	4,107 ( 22.2) ( 100.0)	1,499 ( 8.1) ( 100.0)	737 ( 4.0) ( 100.0)	18,534 ( 100.0) ( 100.0)

(of all dwellings with loft space)

**Table 3.1 Cavity wall insulation - Proportion of cavity wall dwellings with cavity wall insulation**

	count(000s), (column%)
<b>Cavity wall insulation present?</b>	<b>Dwellings</b>
Cavity with insulation	5,334 ( 36.3)
Cavity uninsulated	9,357 ( 63.7)
Total	14,691 ( 100.0)

(of dwellings with predominantly cavity wall construction)

Table 3.2 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by dwelling age

	Cavity wall insulation?		count(000s), (row%), (column%)
	Yes	No	
pre 1919	78 ( 11.8)	584 ( 88.2)	662 ( 100.0)
1919 - 1944	582 ( 25.2)	1,729 ( 74.8)	2,312 ( 100.0)
1945 - 1964	1,383 ( 36.5)	2,405 ( 63.5)	3,788 ( 100.0)
1965 - 1980	1,443 ( 33.5)	2,864 ( 66.5)	4,307 ( 100.0)
1981 - 1990	832 ( 44.8)	1,023 ( 55.2)	1,855 ( 100.0)
post 1990	1,016 ( 57.5)	751 ( 42.5)	1,767 ( 100.0)
Total	5,334 ( 36.3)	9,357 ( 63.7)	14,691 ( 100.0)

(of dwellings with predominantly cavity wall construction)

**Table 3.3 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by dwelling type**

	Cavity wall insulation?		count(000s), (row%), (column%)
	Yes	No	
End terrace	489 ( 36.4)	853 ( 63.6)	1,341 ( 100.0)
Mid terrace	714 ( 32.6)	1,474 ( 67.4)	2,188 ( 100.0)
Semi detached	1,720 ( 34.6)	3,255 ( 65.4)	4,976 ( 100.0)
Detached	1,645 ( 43.7)	2,119 ( 56.3)	3,764 ( 100.0)
Purpose built	760 ( 33.0)	1,545 ( 67.0)	2,305 ( 100.0)
Converted & non-residential	6 ( 5.3)	111 ( 94.7)	118 ( 100.0)
Total	5,334 ( 36.3)	9,357 ( 63.7)	14,691 ( 100.0)

(of dwellings with predominantly cavity wall construction)

Table 3.4 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by tenure

	Cavity wall insulation?		count(000s), (row%), (column%)
	Yes	No	Total
Owner occupied	3,736 ( 35.3)	6,835 ( 64.7)	10,571 ( 100.0)
Private rented	288 ( 27.3)	767 ( 72.7)	1,055 ( 100.0)
Local Authority	760 ( 5.4)	1,030 ( 8.2)	1,790 ( 7.2)
RSL	550 ( 42.4)	725 ( 57.6)	1,275 ( 100.0)
Total	5,334 ( 10.3)	9,357 ( 7.7)	14,691 ( 8.7)
	( 36.3)	( 63.7)	( 100.0)
	( 100.0)	( 100.0)	( 100.0)

(of dwellings with predominantly cavity wall construction)

**Table 3.5 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by household composition**

	Cavity wall insulation?		count(000s), (row%), (column%)
	Yes	No	
couple under 60	1,011 ( 36.8)	1,737 ( 63.2)	2,748 (100.0)
couple 60 or over	985 ( 41.2)	1,408 ( 58.8)	2,393 (100.0)
couple with children	1,214 ( 35.9)	2,172 ( 64.1)	3,387 (100.0)
lone parent with children	351 ( 36.4)	613 ( 63.6)	965 (100.0)
large adult household	267 ( 31.9)	570 ( 68.1)	836 (100.0)
one person under 60	521 ( 30.6)	1,185 ( 69.4)	1,706 (100.0)
one person 60 or over	875 ( 39.9)	1,320 ( 60.1)	2,195 (100.0)
Total	5,225 ( 36.7)	9,005 ( 63.3)	14,229 (100.0)

(of dwellings with predominantly cavity wall construction)



Table 3.5 Cavity wall insulation - Proportion of dwellings with cavity wall insulation by household income quintiles

	Cavity wall insulation?		count(000s), (row%), (column%)
	Yes	No	
1st quintile	1,056 ( 38.5)	1,689 ( 61.5)	2,745 ( 100.0)
2nd quintile	1,093 ( 38.1)	1,778 ( 61.9)	2,871 ( 100.0)
3rd quintile	1,051 ( 35.7)	1,894 ( 64.3)	2,945 ( 100.0)
4th quintile	994 ( 33.6)	1,969 ( 66.4)	2,963 ( 100.0)
5th quintile	1,030 ( 38.1)	1,675 ( 61.9)	2,705 ( 100.0)
Total	5,225 ( 36.7)	9,005 ( 63.3)	14,229 ( 100.0)

(of dwellings with predominantly cavity wall construction)