Chartered Institute of Environmental Health

CIEH guidance on enforcement of excess cold hazards in England

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1. Introduction

The introduction of the Housing Health and Safety Rating System (HHSRS) and Part 1 of the Housing Act 2004 has provided local authorities with the opportunity to effect improvements to the thermal environment of dwellings for occupiers. Such powers were not available under former legislative provisions and this is a welcome addition.

During the years since the statistical evidence underlying HHSRS was gathered, there has been a lot of action by councils, homeowners and landlords to improve energy efficiency in dwellings across all tenures. In addition, a lower level of early winter deaths is now considered to be the average. These factors are likely to have reduced the prevalence of the excess cold hazard in the housing stock. However excess cold still ranks as one of the most significant hazards likely to be encountered by practitioners.

The CIEH therefore considers that there is a need for further guidance, to help practitioners assess excess cold hazards. In addition further advice on appropriate remedial measures for excess cold hazards would assist practitioners to specify remedial works with greater confidence.

1. Introduction

1.1 Aim and objectives

The aim of this guidance is to assist private sector housing enforcement officers to identify and deal with excess cold hazards under Part 1 of the Housing Act 2004.

The objectives are to:

1. Review the legislative basis for excess cold assessments, within the existing legal framework.
2. Look at the assessment of the hazard of excess cold, having regard to the guidance set out in the HHSRS Operating Guidance.
3. Suggest an enforcement approach to the hazard excess cold, highlighting a range of measures that councils could reasonably require in enforcing improvements under the provisions of Part 1 Housing Act 2004.

1.2 Scope

The only statutory guidance for enforcement of the HHSRS is the HHSRS Operating Guide and the HHSRS Enforcement Guidance. The Housing Act 2004, Section 9 requires officers to have regard to this guidance. The guidance focuses on threats to health and safety, with less emphasis on matters of quality, comfort and convenience, even though these matters could impact, in some cases on a person's physical or mental health, which are mentioned in the Operating Guide paragraph 1.06. This CIEH guidance builds on and updates the advice on the excess cold hazard contained in the statutory guidance.

This guidance does not intend to recommend definitive solutions. It is guidance to assist with enforcement of excess cold hazards within the ethos of the HHSRS. Enforcement action and remedial works can only be decided in relation to the deficiencies in the individual property concerned, how they impact on the occupiers or likely occupiers and the enforcement policy of the individual local housing authority. This guidance does not cover the types of financial or practical assistance available to private landlords and tenants to voluntarily improve the energy efficiency of their dwellings, although some of the principles of energy efficiency covered will be relevant.

1.3 Why produce more guidance?

Excess cold is one of the highest scoring and most prevalent hazards. There are particular problems posed by the amount of older energy inefficient housing stock in England and Wales, particularly homes with solid walls in the private sector housing stock many of which are hard to treat.

Dealing with excess cold hazards can contribute to a reduction in:

- death and ill health associated with excess cold
- costs to the NHS for treating the above diseases
- fuel poverty, and
- CO_2 emissions.

The health effects of excess cold hazards include cardiovascular and respiratory disease, especially in older people. For more details see the HHSRS Operating Guidance page 60 and the Review of Health and Safety Risk Drivers, pages 24-31. Also the increased cost of heating affected homes can cause stress and anxiety to the occupiers, especially if they are in fuel poverty.

According to the CIEH Toolkit: Good housing leads to good health (2008), the cost to the NHS of dealing with cold-related illnesses and conditions costs approximately £1 billion per year. The HHSRS cost calculator shows that excess cold and falls hazards are the most cost effective hazards to deal with in terms of savings to the NHS.

Fuel poverty is increasing as a result of rising fuel costs and the economic downturn. It is a particular problem for older people who are particularly vulnerable to the health effects of excess cold. According to Friends of the Earth, the number of households living in fuel poverty was 4.6 million in 2009; this figure has increased from 1.2 million in 2004.

In paragraph 2.12 the Enforcement Guidance states:

"Local authorities should consider an HHSRS

inspection where the property is to be considered for improvements under any strategies to deal with fuel poverty, to improve energy efficiency or to increase the proportion of vulnerable people living in decent homes. Additionally, where an owner or landlord refuses a Warm Front grant or declines to reply to enquiries by scheme managers, or where a private landlord declines to co-operate with an approach from an energy supplier under EEC, the authority should treat such information from a scheme manager or energy supplier as an indication that an inspection may be necessary to establish whether anything needs to be done to protect the occupant from excess cold, or damp and mould affecting the property. Authorities should bear in mind that any action taken under the HHSRS must be in relation to a hazard. It will not be in relation, directly, to alleviating fuel poverty or improving energy efficiency, though this may be the outcome."

One of the recommendations of the report of the House of Commons Select Committee for CLG Beyond Decent Homes was:

"that the Government formulate and disseminate practical guidance on what constitutes a risk of excess cold under the HHSRS, building on the existing guidance for landlords and property related professionals on the HHSRS".

We are not aware that any such guidance will be produced in the foreseeable future. However new evidence has come to light since the drafting of the Operating Guidance, of which practitioners need to be aware to be able to enforce excess cold hazards effectively. In addition there have been a number of appeal decisions which relate to improvement notices concerning excess cold hazards. (A summary of RPT decisions will be available in the forthcoming National Energy Action publication "HHSRS your power to warm homes in the PRS: A toolkit to support LA's in tackling fuel poverty." Also see Appendix 7.)

This guidance will assist practitioners to use the regulatory powers effectively to improve the health of residents living in cold homes, especially the elderly and vulnerable.

1.4 Assistance for landlords and tenants

Where the landlord or tenant is willing to improve the thermal comfort and energy efficiency of a dwelling voluntarily they should be supported by referring them to guidance such as that produced by the Energy Saving Trust and by giving advice. It may be appropriate to refer them to the local energy advice centre or to energy supply companies.

There are a number of schemes available which promote energy efficiency in the home such as Warmfront and Carbon Emissions Reduction Target (CERT) funding from energy companies, both due to be phased out in 2012. The work of Warmfront will be included into the forthcoming Green Deal and CERT will be replaced by a new Energy Company Obligation (ECO) which it is proposed will provide funding for energy efficiency works to hard to treat homes and those in fuel poverty. If landlords will not make the improvements voluntarily, action under Housing Act 2004 is currently the only available enforcement power. Each local authority should liaise with Warmfront and energy supplier teams and their replacements (from 2012) to ensure that cases are referred to the enforcement team where a landlord refuses to give permission for energy efficiency works. Practitioners should note that some such referrals have been for minor issues, such as provision of energy efficient light bulbs. Referrals should be prioritised accordingly.

When taking enforcement action for excess cold hazards, local authorities should consider providing advice to landlords on schemes which may assist with the cost of the works including the Landlords Energy Saving Allowance which provides a tax allowance of up to £1,500 spent on certain energy efficiency measures.

The forthcoming publication by National Energy Action mentioned above will provide a wealth of information, which complements this guidance.

2. Assessing excess cold hazards

2.1 Introduction

The assessment of excess cold hazards by surveying the dwelling and scoring the deficiencies in accordance with the Operating Guidance is done in the same way as for other hazards. However there has been some change in the energy efficiency of dwellings and evidence for the health effects of excess cold since the data was published in the Operating Guidance, more detailed evidence for this is in Appendix 3. This chapter explains these changes and how they affect the assessment of the hazard. In addition, it considers the role of the Standard Assessment Procedure (SAP) in HHSRS assessments for excess cold hazards. Finally deficiencies related to excess cold are discussed in relation to the key elements affecting excess cold: heating, insulation and ventilation.

A survey form and checklist are included in Appendix 1 to assist practitioners to assess excess cold hazards when they survey each dwelling.

2.2 Averages for excess cold hazards

Excess cold is a hazard which covers the threats to health from sub-optimal indoor temperatures. The Operating Guidance in Appendix D, states that statistical evidence shows that there is a continuous relationship between indoor temperature and vulnerability to cold-related death. The guidance identifies deaths from cardiovascular conditions and respiratory diseases as being major contributors to Britain's high level of excess winter deaths. The guidance also highlights that changes in ambient (outdoor) temperature appears to be the main causal factor for excess winter deaths and, whilst the extent to which housing contributes is not clearly known, the indication is that people living in dwellings that are poorly heated are at significantly greater risk.

Of the 29 HHSRS hazards excess cold has the highest average scores. In most cases the average in the Operating Guidance shows a category 1 hazard. The guidance also suggests that the average likelihoods and harm outcomes in annex D represent the typical condition that could be expected in a dwelling of that type/age. Given the high average HHSRS scores, the Operating Guidance (paragraph 4.14) states that hazards should be scored if average or below average.

The very large numbers of dwellings that will contain a category 1 hazard for excess cold according to the Operating Guidance has caused some difficulty for practitioners. As excess cold has the highest average HHSRS scores, it should be the most commonly enforced hazard by local authorities. However changes in the evidence for excess cold since the publication of the Operational Guidance have affected these averages leading to fewer dwellings having category 1 hazards for excess cold. This will enable local authorities to focus on the dwellings with more serious problems for enforcement action.

The average HHSRS scores for excess cold in the Operating Guidance (Annex D paragraph 2.02) were derived from data for the years 1997 to 1999 when the average number of excess winter deaths per year was in the region of 40,000. In recent years the level has been nearer 25,000. (See Appendix 3 for more details.)

The Operating Guidance based its statistics for the energy efficiency of the housing stock on the 1996 English House Condition Survey (EHCS) report. The most recent data is in the English Housing Survey (2008), which concluded that there had been a "substantial improvement in the average energy efficiency of dwellings in all tenures between 1996 and 2008". (See Appendix 3 for more details.)

The average likelihood and health outcomes in the Operational Guidance for excess cold now provide an over-estimate of the potential for harm. This is due to improvements in energy efficiency and changes in evidence for winter deaths since publication. These changes mean that the current "average" for many built types no longer scores above the 1000 threshold. It is important that practitioners do not automatically consider a type of dwelling to be a Category 1 hazard, but consider the deficiencies which exist which could lead to sub-optimal temperatures.

This guidance cannot go so far as to prescribe new average HHSRS scores for the various dwelling types and ages. However, when carrying out assessments, practitioners should take account of this evidence and be aware of the continually improving average HHSRS scores since the Operating Guidance was published. This evidence should give practitioners more confidence in carrying out their assessments and will enable local authorities to better prioritise dwellings for enforcement action.

Council's such as Bristol and Reading have used local information to get more local and up to date hazard profiles to inform their decisions when assessing excess cold hazards. For example they have:

- reviewed data on excess cold hazards previously identified in the council's area and identified the common types of housing affected (e.g. areas of terraced housing, 80s housing),
- compared data from local stock condition surveys and with English Housing Survey data.

Later chapters in this document will look at options for remedial works to combat deficiencies in dwellings with excess cold hazards. It should be remembered that the issue of the specification of improvement measures to address an excess cold hazard is entirely independent of the assessment and scoring stage. The nature of required improvements is not dependent on whether the dwelling has been judged to contain a category 1 or 2 excess cold hazard. Save that for category 1 hazards, the works should be sufficient to improve a dwelling so that a category 1 hazard no longer exists.

2.3 Standard Assessment Procedure (SAP) in HHSRS Assessment

SAP is a form of energy modelling, which is an approved methodology for assessing the energy efficiency of dwellings. SAP makes data and recording assumptions based upon property age and type and location. SAP (2005 & 2009) takes into account space heating, water heating and lighting. It is expressed on a scale of 1 (very inefficient) to 100 (zero energy cost).

RDSAP is a sub-set of SAP and is designed for existing dwellings, it makes data collection easier. It is used for Energy Performance Certificates and stock condition surveys etc.

When assessing an excess cold hazard paragraph 2.26 of the HHSRS Operating Guidance (Appendix D), states:

'The assessment should take account of the adequacy of the heating, insulation and ventilation. This may involve assessing the dwelling energy rating (using SAP) and any other factors which might affect the indoor temperature, such as dampness, or disrepair to the structure or to the space or water heating *sic* system.'

The provision of hot water for dwelling is not directly related to increasing air temperature but the system of water heating is often an integral part of the space heating system. An expensive or inefficient system for heating water will impact upon energy efficiency and ability to heat the dwelling. The RPT decision on the Newham case paragraph 36 said that the efficiency of the hot water system was relevant to excess cold, though adequacy was not.

The HHSRS assessment and SAP consider matters in common. Confusion has arisen because a SAP rating of less than 35 has been suggested as a proxy for a category 1 excess cold hazard (paragraph 5.27, A Decent Home: Definition and guidance for implementation: DCLG: June 2006). No official explanation of why the SAP 35 was mentioned as a proxy for category 1 hazard has been published. This is a 'broad-brush' approach that does not allow for any further differentiation of risk by attributing it to a hazard band. The proxy also refers to a SAP rating assessed using the 2001 methodology rather than the current SAP methodology and it is not practically possible to compare scores. As such the SAP rating in the Decent Homes Guidance is not necessarily helpful when assessing an excess cold hazard.

With regard to SAP and the HHSRS, there is some connection between them. An understanding of energy modeling can assist practitioners' confidence with their HHSRS assessments. Knowledge of a dwelling's energy performance will also help inform the excess

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cold assessment, but there are some limitations in the use of SAP and it important that the following distinctions are understood:

- SAP is a measure of the energy performance of a dwelling and HHSRS is an assessment of the likelihood of someone over the age of 64 years suffering harm over the course of a 12 month period which may require them to need medical attention. SAP is simply a measure of energy performance and this is a material consideration within the assessment of the hazard score under HHSRS.
- SAP calculates heat loss through a wall using an assumed window area. Unless insulation measures can be specifically identified, SAP assumes default values based upon property age. The actual situation for particular dwellings for heat loss and insulation may be very different.
- SAP standardises for location so regional variations are not taken into account. Whilst a SAP rating will have regard to the type of dwelling such as it being semi-detached or end-terraced etc, it does not take into account the orientation of the dwelling or its locality within the country, both of which may be important to the HHSRS assessment for excess cold. This could be a relevant factor for a particular dwelling that is not taken into account within a SAP assessment.
- SAP assessments for houses in multiple occupation with multiple kitchens, bathrooms etc. requires too many assumptions to be made to make the resulting rating reliable.
- The SAP rating is partly based upon the system in place to provide hot water, whether hot water storage vessels are insulated and whether low energy lighting is provided, amongst other matters. These are not part of the assessment under HHSRS and have little relevance to the occurrence of harmfully low indoor temperatures.
- SAP ratings do not include draughts.
- The SAP rating takes into account the energy source used for heating and hot water.

These points illustrate how SAP cannot be considered as an exact replacement or substitute for a full HHSRS assessment to be carried out.

However, the use of energy modeling such as SAP may be helpful to weigh up the relative merits of different solutions to mitigate an excess cold hazard. For example in the Haringey RPT case the SAP rating for the dwelling, if fixed convector electric heaters were installed to every room would be 11, whereas if gas central heating was installed the SAP would be 59.

SAP will also be a useful tool to assist with the development of local priorities for cold homes, identifying properties with the lowest energy performance for further action under HHSRS and area strategies to tackle affordable warmth, decent homes and fuel poverty, all of which have a relationship to excess cold.

A SAP assessment is not a substitute for an HHSRS assessment for excess cold. Under HHSRS, the assessment must be carried out in accordance with the legally prescribed method and having regard to the Operating Guidance. SAP ratings do not offer an alternative to informed professional judgement in assessing excess cold hazards; this process is set down in the Operating Guidance and must be followed. It is important that robust evidence is based on the health effect of low temperatures in the home rather than relying purely on SAP.

With some other hazards under HHSRS, practitioners may decide to obtain more specialist surveys or expert opinion to assess risk. SAP should be seen in the same context. It can provide additional information and evidence to make an assessment of the risk presented by a dwelling. Practitioners may decide to carry out a SAP rating (or to employ an energy consultant to do so) to support the robustness of their HHSRS assessment or strengthen evidence when enforcement action has been challenged. Energy modelling might also prove helpful to compare the various options for improvement of dwellings for excess cold through their thermal performance and comparing the effect of heating solutions from different energy courses. However, the weight given to a SAP assessment and the importance attached to it must be made within the context of excess cold under HHSRS.

2.4 Deficiencies

Section 13 of the Housing Act 2004, states the deficiencies giving rise to the hazard should be included in an Improvement Notice served under section 11 or 12. The deficiencies are identified during the assessment of excess cold hazards by identifying the current provision for heating, insulation and ventilation and assessing their inadequacies and how they contribute to the excess cold hazard. When carrying out HHSRS assessments, it is important to consider the deficiencies in all these key elements together and their effect on the health of the occupier.

It may be useful to refer to Table 1 in Appendix 3 which shows typical characteristics of dwellings with respect to heating, insulation and ventilation.

A number of worked examples, collected by Lacors, provide more information which can help practitioners to identify the deficiencies. These worked examples can be viewed by signing up to the Private Sector Housing Forum on the LGA's Knowledge Hub website. Standard clauses for deficiencies can be found in Appendix 2. More technical details on heating, insulation and ventilation can be found in parts 6 to 8 of this guidance.

2.4.1 Heating deficiencies

For heating, the Operating Guidance, Annex D paragraph 2.24 states that the following matters affect the likelihood of a hazardous occurrence and the spread of harm outcomes:

- "Type of heating provision – inappropriate or inefficient systems and appliances
- Size of heating system – systems and appliances inadequate for the size of dwelling
- Installation and maintenance of heating system – inadequately installed or maintained systems
- Controls to heating system – inadequate or inappropriate controls to the system or appliance."

When identifying the deficiencies, all these aspects of heating should be considered.

Examples of inefficient systems include permanently lit pilot lights, open flues as seen in back boilers, and cast iron heat exchangers.

For gas boilers and heating appliances, any records of servicing, breakdown, maintenance and gas safety checks will provide useful additional information to help identify deficiencies. Deficiencies are likely to be found in poorly installed or inadequately designed systems but more commonly in older central heating systems.

In the majority of cases existing individual room heaters will not be adequately controllable, or will not enable the whole of the dwelling to be adequately heated. These will not generally be considered to be an adequate form of heating where an excess cold hazard exists. Exceptions may be where the dwelling is small and well insulated or in some bedsit HMOs.

It is important to not be influenced by the way the occupiers use or control the heating; however the cost of heating the dwelling should be taken into account to some extent. See section 5.2 below.

2.4.2 Insulation deficiencies

There can be inadequate insulation to loft or roof spaces, external walls and floors.

As far as loft insulation goes, 250mm or more of mineral or cellulose fibre is likely to be considered the ideal, so:

- A deficiency is likely to exist in a home where there is less than 150mm insulation.
- Where existing provision is between 150mm and 200m. any deficiency will need to be justified on the basis of maintaining a healthy indoor environment by considering the actual level of existing insulation with the typical average provision.
- Where more than 200mm of insulation is present a deficiency is unlikely except where there is a particularly high exposure, such as where there are more than two exposed perimeter surfaces to the dwelling.

If there isn't a loft hatch in a conventional pitched roof, officers should assume that no insulation is present.

Some rooms will be cold because they have two or more external walls, which are inadequately insulated or are in poor condition. Similarly, where a roof space is occupied as habitable

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room or where a flat roof is present above a habitable room a lack of insulation may be a major deficiency.

Where there is a flat roof, practitioners should try to identify the date of construction and look at Building Regulations for that time, to assess the adequacy of the insulation. If this is not possible, they may assume that the insulation is well below the required standard. Other issues such as condensation and mould on the ceilings may also help officers come to this conclusion.

Single glazed windows can have deficiencies for excess cold because of minor defects e.g. cracked panes, gaps causing draughts and rotten timber or through major defects which cause serious draughts or exposure. Practitioners should also take account of the contribution that the presence of large areas of single glazed windows which can increase the likelihood of harm.

A simple heat loss calculation (area of element x U value of that element) can often assist to illustrate the relevant heat loss through each element and highlight the element which contributes most to heat loss from the dwelling.

2.4.2 Ventilation

Up to 15% of heat loss from dwellings can occur from draughts.

The Operating Guidance, Annex D, paragraph 2.18 says:

"excess ventilation wastes heat and reduces air temperatures. It also causes draughts and discomfort. Excess ventilation may be caused by too large or inappropriately sited permanent openings or large openable windows. Draughts can also be caused by ill fitting butt-jointed floor boarding or ill-fitting doors or windows."

Draughts need to cause excessive heat loss rather than simple discomfort if they are to be considered a deficiency.

There should be a means for ensuring low level background ventilation without excessive heat loss or draughts. It should be controllable, properly installed and appropriate the particular part of the dwelling. There should be means for rapid ventilation in kitchens and bathrooms.

The relevant matters affecting deficiencies arising from inadequate ventilation are:

- Amount of ventilation is inadequate, excessive or inappropriate.
- Ventilation controls are inadequate.
- Ventilation system or controls are defective.
- Draughts are uncontrollable and cause significant discomfort.

The inter-relation between heating, insulation and ventilation is important as, for example, heating provision that is satisfactory in one dwelling may be less so in another where insulation and/or ventilation is/are poorer. Also levels of loft insulation would vary in importance depending upon other dwelling characteristics and heating provision. Parts 6 to 8 of this guidance explore the relationship between these elements, which are also relevant to deficiencies.

2.5 Conclusion on assessment of excess cold hazards

When assessing an excess cold hazard there is a need to take into account current figures for the energy efficiency characteristics of the housing stock and for evidence of the health effects of living in cold homes. SAP assessments of dwellings cannot be used instead of HHSRS assessments to assess excess cold hazards, but they may enhance the assessment or help to identify appropriate remedial measures. They may also provide additional supporting evidence for the HHSRS assessment when formal enforcement action is subject to challenge.

The deficiencies identified during the assessment of an excess cold hazard will relate to the heating, insulation and ventilation of the dwelling. When enforcement action is to be taken to deal with an excess cold hazard, the remedial action must relate directly to the deficiencies identified.

3 Appraisal of enforcement options

3.1 Introduction

Once an excess cold hazard has been identified by an HHSRS assessment, a decision will need to be made on which enforcement option under Part 1 of the Housing Act 2004 is most satisfactory. Local authorities have a duty to act where a category 1 hazard exists and has discretion on whether to take enforcement action where a category 2 hazard exists. For the latter, local authorities will need to consider their local priorities and policies that relate to objectives to deal with cold homes, including fuel poverty, affordable warmth and carbon reduction. Guidance on this should be available in the local authority's enforcement policy.

When considering the most appropriate enforcement option, regard must be had to the current occupiers of the dwelling as to whether they are, or are likely to be, members of the most vulnerable group. This is the key issue when considering the enforcement options where an excess cold hazard needs to be dealt with.

3.2 Having regard to occupation by persons not in the vulnerable age group

Although the current occupier of the dwelling is not considered in the HHSRS assessment, they are considered when the enforcement options are being considered. The HHSRS Enforcement Guidance states:

"in determining what action to take, authorities should use their judgment to take account of the current occupant. This does not mean that action should always be based on the vulnerability of the current occupant. Action can be taken whether or not a person at most risk to the hazard is living in the dwelling or is a regular visitor to it. The authority should consider the turnover of tenancies. Where they consider that a wide range of occupants might potentially occupy the premises in future they may take the view that action in respect of the current condition of the premises is justified."

The HHSRS Operating Guidance advised that persons aged 65 years or over are the vulnerable group for the excess cold hazard.

Excess cold is concerned with the health impact of low internal temperature in dwellings, which directly relates to an assessment of adequate heating and insulation etc. As far as age goes, there is no definitive cut-off point for a temperature giving rise to a risk to health for every person. The Operating Guidance, Annex D, 2.08 states:

"Although there are some excess winter deaths in all age groups, it becomes significant for those in the 45+ age group. This risk increases in a roughly linear pattern up to the 85+ age group, after which there is a marked increase in risk."

3.3 How to take account of the occupants in decision-making

The actual circumstances of occupiers must be taken into account in reaching the enforcement decision for excess cold once the actual assessment has been completed. When premises have been assessed as a category 1 hazard for excess cold, it doesn't necessarily follow that an improvement notice will be required if the actual or likely future occupants are not a member of the vulnerable age group. It may assist practitioners to think along the lines that having carried out an assessment of the severity of the risk to the vulnerable age-group (their HHSRS assessment), they should then repeat this exercise, at least in their own minds, for the actual and likely future occupants if they are not of such an age group and determine the relative risk to those persons. The types of questions that are suggested the practitioner should ask of himself or herself are as follows:

- Is occupation by a member of the vulnerable age group likely in the short and/or medium term?
- Is there any significant risk of serious harm even if occupiers are not of the vulnerable group?
- Does common sense suggest that it's likely that someone is going to be harmed, regardless of his or her age?

Although they are not identified in the Operational Guidance, other groups whose health is likely to be affected by excess cold

3 Appraisal of enforcement options

should be considered. The NHS publication Keep Warm Keep Well for health and social care professionals suggests the following groups are vulnerable:

- Young age – particularly children with respiratory problems, such as asthma.
- Chronic and severe illness – including heart conditions, respiratory insufficiency, asthma and COPD (chronic obstructive pulmonary disease).
- Inability to adapt behaviour to keep warm – this affects people with disabilities, babies and the very young.

Cold can affect the health of people of all ages. The severity of the hazard as represented by the HHSRS score needs to be balanced against the vulnerability of the existing and likely future occupiers, whatever their age.

Care needs to be taken in basing action on the vulnerable age group for excess cold when they are unlikely to be present in the dwelling. The HHSRS Enforcement Guidance states that: "Action is based on the authority's judgment as to the most appropriate means of dealing with the hazard, taking account of both potential and vulnerable occupants." This point will need to be considered in each case when the practitioner is deciding on the appropriate enforcement action to deal with the excess cold hazard. It is suggested that there is a distinction between the risk of ill health and the risk of discomfort and practitioners should be clear on this point in taking enforcement action.

Paragraph 7.8 of the Explanatory Memorandum to The Housing Health and Safety Rating System (England) Regulations 2005: also states "In determining which course of enforcement action to take, local authorities will be expected to take account the potential impact of that action upon the current occupier, and on potential future occupiers. This means that, for instance, in accommodation which a landlord lets only to young able-bodied adults, authorities will be able to take a more tolerant view of hazards which are likely to present significant risks only to the elderly or very young." This clearly sets out what is not an unreasonable expectation that regard should be had to the actual and likely occupants in determining what type of enforcement action is appropriate

The decision in the appeal to the Lands Tribunal, taken by Bristol City Council (1 February 2010) said that the views of the existing tenants should be taken into account when deciding what action should be taken to deal with an excess cold hazard. It also emphasised that an enforcement action must be taken to deal with the hazard and, in the case under consideration, the decision said that a Hazard Awareness Notice should have been served.

The statement of reasons (Housing Act 2004, section 8) that must accompany any enforcement action should demonstrate that the presence of the most vulnerable age group has been properly considered and the views and wishes of the current occupants have been taken into account.

In some cases, practitioners may decide to serve a Suspended Improvement Notice rather than an Improvement Notice. Here some or all of the remedial action that would be regarded as appropriate for a vulnerable person, could be suspended until such time as the premises are occupied by such a person. Suspended notices must be subject to regular review and at no greater than 12 month intervals.

The service of a Hazard Awareness Notice would not normally be regarded as an appropriate enforcement action for a category 1 hazard. However, the evidence supporting the excess cold hazard is clear as to who is at greatest risk of ill health as a result of excessively low indoor temperatures. This requires practitioners to seriously consider the age and vulnerability of the occupants. For the excess cold hazard, it may therefore be appropriate in some circumstances for a Hazard Awareness Notice to be served. An example would be where a member of the vulnerable age group refuses to agree to remedial works being carried out.

Practitioners also need to take care in their selection of the most appropriate enforcement action to take in relation to an excess cold hazard to remember the basis for action under Part 1 of the Housing Act 2004. The legislation is intended to allow action to be taken where

there is an unacceptable level of risk of ill health. Paragraph 2.12 of the Enforcement Guidance states:

"Authorities should bear in mind that any action taken under the HHSRS must be in relation to a hazard. It will not be in relation, directly, to alleviating fuel poverty or improving energy efficiency, though this may be the outcome."

Therefore whilst taking action on excess cold will assist with carbon reduction targets etc, this is not the purpose of Part 1 and practitioners need to justify their actions on the basis of reducing the risk of ill health rather. Failure to do so could lead to a successful challenge on appeal.

3.4 Social Exclusion & Discrimination

Concern has been expressed that taking less robust action than an Improvement Notice, having regard to the actual occupation may lead to social exclusion or be seen as an age-discriminatory action. The choice of the appropriate enforcement action will need to be carefully considered for each dwelling on its own merits in accordance with the HHSRS Enforcement Guidance. What might be regarded as an adverse impact might be unavoidable and as long as the situation has been carefully considered and balanced decision is made, discrimination will not result.

With regards to the issue of action leading to social exclusion, officers should consider how likely it is that the 65 years and older age group will use a residential premises. The letting history and the owner's ongoing proposals will be important as well as the type of premises, its accessibility and other relevant matters. Suspending the requirements of an Improvement Notice until someone 65 years or older occupies part of an HMO is unlikely to be attractive to that age group anyway and would not be considered to be a cause of social exclusion. Consideration of how likely any particular premises is to be occupied by a member of the vulnerable group will assist in understanding, whether the risk of causing social exclusion is a theoretical one, or one with more substance. It will also assist in determining the appropriate course of enforcement action.

3.5 Emergency remedial action

Where a category 1 hazard exists and there is no heating, for example where a boiler has broken down, emergency remedial action may be appropriate. Here is it necessary to prove an imminent risk of harm to the occupier. More information can be found in the LGR FAQ Is it appropriate to use emergency remedial action for lack of heating and hot water?

The Lands Tribunal case involving Bolton BC decided that there was no imminent risk of serious harm to the occupiers because:

- The boiler had not been working for five months and the risk could not be said to have increased because cold weather was predicted in a five day weather forecast in November, and
- Temporary heating had been provided by the landlord.

3.6 Conclusion on enforcement options

When deciding on the enforcement option to deal with an excess cold hazard practitioners need to take account of the actual and likely future occupants of the dwelling in relation to the severity of risk of ill health that they actually face. This does not mean that an improvement notice cannot be served where all the occupiers are under 65, but that consideration needs to be given to whether there is a chance that the dwelling, or a room in it, may be let to a tenant over 65 in future.

The rest of this guidance aims to assist enforcement officers to identify and specify appropriate remedial measures.

4 Remedial measures

4.1 The scope of remedial works

Where the most appropriate enforcement action is to serve a notice to remove category 1 or 2 excess cold hazards, under section 11 or 12 of the Housing Act 2004, a specification for remedial work will need to be drafted. This guidance will assist practitioners to write these specifications. The measures specified will depend on the individual circumstances of a particular case and should relate directly to the deficiencies that have been identified during the HHSRS inspection.

On completion of works, the premises must not be a category 1 hazard. Practitioners should therefore consider the full range of possible remedial works to address each deficiency to mitigate the hazard.

The statutory guidance says that remedial measures should:

- be sufficient to remove a category 1 hazard, but may extend beyond this
- prevent a recurrence
- prevent building elements deteriorating
- ensure measures can be justified to benefit the health of the occupiers
- be reasonable in relation to the hazard
- be cost effective in terms of the health risk reduction.

These points are discussed in more detail below.

The HHSRS Enforcement Guidance states that works must be sufficient to remove a category 1 hazard 'but may extend beyond this' and that they should prevent a recurrence of the hazard. It warns against a 'patch and mend' approach, stating that, "Any works required to mitigate a hazard should be carried out to a standard that prevents building elements deteriorating. It would be false economy to allow work which only temporarily reduces a category 1 hazard to, say a band D category 2 hazard."

The works specified must be "reasonable in relation to the hazard". In considering reasonableness regard must be had both to the cost to the property owner and the effect on the health of the occupier. An appropriate package of the necessary heating, insulation and/or ventilation will be relevant to remove the excess cold hazard and may extend beyond that. What is reasonable will depend on the deficiencies, the cost of works, and the type, size, and age of construction of the dwelling. Clearly, remedial works that are appropriate for a Victorian detached dwelling may not be applicable to or justifiable for a small, more modern flat.

It would be reasonable to aim for category 1 hazards to be mitigated to the level of a Band E, category 2 hazard, where the hazard is rescored after the works have been carried out. The practicality of achieving such an aim would depend on the particular type of construction of the premises and the extent of the remedial works.

4.2 Key elements of remedial works

The heating system, the insulation and ventilation of premises are the key elements of remedial works to remove excess cold hazards. The choice of mitigation works will vary, depending on the deficiencies, their severity and the type of property and its occupiers in the particular case.

Heating, insulation and ventilation are inter-related and must be assessed on the basis of how they interact with each other, overall impact and contribution each of them make to achieving and maintaining a healthy indoor temperature. These are primary considerations when considering the specification of appropriate remedial measures.

The deficiencies identified in the dwelling will influence the identification of remedial works, which can be prioritised on the basis of their cost effectiveness to remove the excess cold hazard. They are:

1. Provision of a central heating or equivalent whole dwelling heating system;
2. Provision of effective insulation to the structure of the building (roofs, lofts and where practicable, walls) having regard had to the type of heating system to be installed;
3. Draught-proofing to seal disused chimneys and flues (ensuring adequate, but more controlled ventilation);

4. Minor repairs to windows/external doors;
5. Secondary glazing;
6. Replacement of windows with double glazed units;

Clearly these measures above will not be appropriate in every case and can only be applied only to dwellings considering their age and constructional type, size and design. For example different priorities for action may apply to a detached house compared to a small flat.

If the dwelling also has dampness and other hazards related to excess cold it will be of paramount importance that these are remedied before remedial measures to address excess cold are carried out. Such measures would also need to be included in the schedule of remedial works.

The Energy Savings Trust has analysed the measures required to improve the efficiency of dwellings banded as F and G in Energy Performance Certificates to bring them to an E banding. These may be useful when considering remedial works:

1. Cheap to treat band (less than £1000 to improve)

- Homes that can be brought into the E banding through basic loft and cavity wall insulation measures.

2. Boiler band (less than £3000 to improve)

- Properties requiring modern heating systems. In particular to condensing boilers for oil and gas fired heating systems.

3. Windows band (£3000 to £5000 to improve)

- A small group of homes that would require double glazed windows along with basic insulation measures to move to an E banding.

4. Expensive to treat homes (£5000 to £9500 to improve)

- Larger than average homes that are generally electric and oil heated and are generally built with solid wall construction. In addition to double glazing they may require fuel switching (e.g. from electric to gas).

It is recommended that where possible alternative options for remedial works are specified. For example option one could be full central heating and option two could be less costly heating improvements along with upgrading of the insulation to the dwelling.

Where a notice specifies works for other related hazards, it may be worth considering specifying items, which would not normally be specified because they are too expensive. For example if a window requires replacement, the cost of double glazing may be minimal.

The detailed specification of the heating, insulation and ventilation provision in the schedule of remedial works will often be informed by the requirements of Building Regulations, see below. As always, it is important that the works specified in any schedule of works are sufficiently detailed so that the recipient of the notice is aware of what is required. The works should not regurgitate the requirements of Building Regulations but should state precisely what is required to avoid the occupiers being unhealthily cold. They should relate directly to the deficiencies that have been identified and the preventative measures in the Operating Guidance.

It is important to include a statement in the schedule of remedial works that works will need to comply with Building Regulations and any other consents that may be required, such as requirements for listed buildings or consents required in conservation areas. It is also important to allow time to obtain consents in the time period specified in the notice. Also consider whether any additional time may be necessary once works have started for potential delays which may occur if the building is listed or works are affected by conservation area requirements.

Specifications for remedial works or covering letters to notices could outline assistance available to landlords through the Green Deal, Warmfront and any local grants.

See Appendix 8 for suggested standards clauses for remedial works for excess cold.

Heating, insulation and ventilation are considered in more detail with suggestions for appropriate remedial action in Parts 6 to 8 of this guidance.

4 Remedial measures

Table 1 – Payback periods for energy efficiency works:

Box 1: Domestic Efficiency Measures – estimated costs and savings

Source: Department of Communities and Local Government 2006

Measures	Average cost (£)	Cost saved (£/yr)	Carbon saved (kgC/yr)	Pay-back (yrs)	Potential homes ('000)†	Potential total carbon saving (MtC/yr)
Hot water cylinder insulation	14	29	53	0.5	1,137	0.1
Cavity wall insulation	342	133	242	2.6	8,500	2.1
Loft insulation (full and top-up)	284	104	190	2.7	6,186	1.2
Improved heating controls	147	43	77	3.4	2,102	0.2
Draught proofing	100	23	43	4.3	9,793	0.4
Micro CHP	1,571	230	508	6.8	12,000	6.1
Solid wall insulation	3150	380	694	7.5	7,479	5.2
A-rated boiler	1,500[1]	168	177	8.9	17,128	3.0
Micro wind	2,363	224	263	10.5	–	–
Ground source heat pump	4,725	368	990	12.8	17,000	16.8
Photovoltaic (PV) electricity	9,844	212	249	46.4	9.892	2.5
Solar water heating	2,625	48	88	54.7	19,330	1.7
Windows (Single to Double Glazing)	4,000	41	26	97.6	10,746	1.7

4.3 Building Regulations

The Operating Guidance says that the Building Regulations Approved Documents L1: "Conservation of fuel and power in dwellings" and Part F: "Ventilation of Buildings" are sources of further information for remedial measures.

Compliance with Building Regulations will be necessary where remedial action is specified in an improvement notice. The relevance of Building Regulations is discussed under the main headings of heating, insulation and ventilation in parts 6 to 8 of this guidance. Care must be taken only to specify those measures that remove the hazard under Part 1 of Housing Act 2004 or can be justified as "extending beyond that", rather than the measures required by Building Regulations.

4.4 Are the works cost effective?

The cost of remedial works compared with relative heath risk reduction is a material consideration in determining a reasonable level of work to require. The cost effectiveness of a measure can be used to justify the decision to specify it in the schedule of remedial works. However practitioners should make the link between specified measures and the role they play in improving health outcomes in cold homes and not just on the payback period based on energy efficiency grounds.

When considering the cost benefit of the remedial works, the payback period is a useful concept. It is a figure which compares the cost of a measure to the time taken to recoup the outlay through annual fuel savings. Payback periods can be used to compare the options for remedial works to mitigate the excess cold hazard. Measures with a payback period of less than 5 years are considered low cost energy efficiency improvements and could be considered justifiable priorities for remedial works specified in schedules of works for excess cold. The Building Regulations specify a fifteen year payback period for thermal elements. This will reflect the "ideal" under HHSRS, which may not be justifiable as works needed to remove the hazard or extend beyond that.

Payback periods may also allow further opportunities for remedial action to be identified. For example, the installation of insulation to a ground floor solid floor will not normally be appropriate due to the long payback period, but where there is evidence of dampness, exposing the floor structure might enable insulation to be incorporated within in it, and it will become much more cost effective.

The Energy Savings Trust website contains some information about economic payback periods, for energy efficient improvements to dwellings. They relate to good or best practice for energy efficiency rather than the measures necessary to remove the excess cold hazard but are nevertheless useful sources of further reading.

The table above estimates energy savings from a range of standard house types with gas central heating and standard occupancy. The actual savings depend on individual circumstances. The costs and savings figures will vary according to the size of the dwelling, its location, the measures (if appropriate), fuel, heating system and the materials used.

4.5 The cost of heating the dwelling

The cost to the tenant of heating the dwelling can, to some extent, be taken into account when specifying remedial works, but this is a controversial issue. The cost will depend on the type of fuel, the efficiency of the heating system and the insulation. The affordability of heating has been the subject of a number of RPT cases to date and the decisions of these cases have been diverse.

The Liverpool (case reference MAN/00BY/HPO/2010/004) and Bristol RPT decisions indicate that affordability should not be considered when specifying remedial measures and the Haringey, Newham and Westminster decisions indicate that it should. The Bristol case has been subject to an appeal to the Lands Tribunal, but the issue of affordability was not discussed in the decision. Liverpool CC is considering appealing against their RPT decision. See Appendix 7 for more details of these RPT decisions.

On 16 May 2011 a written answer to an MP's question was recorded in Hansard. It says that CLG believes that the relative cost of operating a heating system is relevant to an HHSRS assessment. They said "The dwelling should be provided with adequate thermal insulation and a suitable and effective means of space heating so that the space can be economically maintained at reasonable temperatures."

It may be relevant to consider that the average duration of a private sector tenancy agreement is currently 12 -15 months The Energy Efficiency Partnership for Homes found that 11% of tenants have moved because their previous rented premises was too expensive to heat.

When deciding which option(s) to specify for an excess cold hazard in a dwelling, the local authority should decide how much the cost of heating should be taken into account in the light of the above RPT decisions and any future RPT or Lands Tribunal decisions. (Lands Tribunal decisions will set a precedent.)

4.6 Conclusion on remedial works

The statutory Operating and Enforcement Guidance discuss the issues to be considered when deciding the extent of the remedial works specified in Improvement Notices for excess cold hazards. The key elements of the remedial works will be heating, insulation and ventilation and these will need to be considered in relation to each other giving a package of remedial measures to mitigate the excess cold hazard. The cost of the measures specified and the requirements of the Building Regulations are important when considering whether the works are reasonable in relation to the ideal. It would be good practice to specify alternative options available for compliance.

The rest of this guidance gives more technical detail about the heating, insulation and ventilation works as relevant to specifications for remedial works for excess cold hazards.

5 Heating

5.1 Background

Heating will be included in most specifications for remedial works to deal with excess cold hazards. Clauses will relate to the type, size, controls, installation and maintenance of the existing heating.

The preventative measures and the ideal as described in the HHSRS Operating Guidance are relevant to the remedial works specified. At paragraph 2.20 of Annex D, it states 'heating should be controllable by the occupiers and safely and properly installed and maintained. It should be appropriate to the design and layout and construction, such that the whole of the dwelling can be adequately and efficiently heated.' The heating system should therefore provide direct heating to every room. The Building Regulations Approved Document L1 is referred in the Operating Guidance as a source of further information and is therefore relevant to HHSRS. It should be noted that they require new boilers to be condensing boilers, unless a competent person states that an exception can be made, see Appendix 4.

The specification for heating works will be influenced by the insulation and ventilation in the dwelling on completion of works; for example more insulation may be required in an older property where there is electric heating than where there is gas heating.

5.2 New central heating systems

The Operating Guidance states at paragraph 2.05 that 'A healthy indoor temperature is around 21˚C'. Where deficiencies relating to inappropriate, inefficient or inadequate heating systems make a major contribution to the likelihood of a hazardous occurrence, it will be appropriate to specify the installation of central heating in most cases. This will usually be the most appropriate type of heating system which is capable of heating the whole of the premises so that a temperature in all rooms of 21˚c can be maintained when the external temperature is below freezing point. This is the most typical form of heating in the national stock and the cheapest to run. However care must be taken to assess each dwelling individually and to take the cost, fuel availability and practicality of installation into account.

A fixed electrical system which is capable of efficiently heating all parts of the premises will be appropriate in some limited circumstances, as an alternative to a full gas heating system, see section 6.4 below.

All schedules of remedial works should also contain a clause that suitable alternative measures may be appropriate, but should be subject to prior written consent with the council.

In general terms the current relative cost of different fuels for heating a dwelling are as follows from least expensive to most expensive:

1. **Anthracite grains**
2. **Gas**
3. **Wood pellets**
4. **Off peak electricity (Economy 7)**
5. **Oil**
6. **LPG**
7. **On peak electricity**

Source – Sutherland Tables (subscription access only).

In deciding whether it is cost effective to specify a gas heating system, practitioners need to take account of the costs involved if a gas supply needs to be installed. Where it is not feasible or cost effective to provide a gas supply to a property, other types of fuel such as electric heating or oil fired central heating systems should be considered. The Energy Savings Trust's guidance on Hard to Treat Homes is helpful to compare fuel costs, efficiencies and suitability.

When considering the appropriateness of different types of heating, practitioners may wish to consult Sutherland Tables which provide statistics on different domestic fuels and the costs of using these fuels under similar conditions.

See Worked Example 4 replacement of fixed radiant bar electrical heaters with a full gas central heating system in older converted Victorian flats.

5.3 Existing central heating systems

Deficiencies in an existing heating system may arise because the system is inadequate or poorly designed, it is not functioning as intended or the controls are insufficient. Remedial works can include repair, replacement or improvement of the system.

Where the controls need to be improved they can often be installed without incurring great cost, although the practicality of installing controls to older heating systems might be constrained by the design of the system. Consider specifying Thermostatic Radiator Valves (TRVs), a programmer and/or a room thermostat. The assessment of what is needed can be aided by comparing the existing controls of the system to the current Building Regulations requirements summarised in Appendix 4; these reflect the ideal for excess cold. When a boiler is being replaced or other work is being carried out on the heating system it will be even more cost effective to upgrade controls, but this may have to be a recommendation rather than a requirement in the specification.

If the central heating is inadequate or poorly designed it may need to be extended or adjusted to adequately heat the whole dwelling.

If an existing central heating boiler is less than ten years old, it may be appropriate to specify replacement of the boiler or the heating system where:

- There are serious or multiple component failures, where the combined cost of the remedial measures may exceed the cost of a new boiler e.g. failure of the boiler's heat exchanger or other major parts.
- There are serious design or installation failures that have caused complete malfunction of the system e.g. multiple component failure or corrosion.
- The capacity of the boiler is not adequate.

Where existing central heating systems are more than 15 years old some parts may be coming to the end of their useful life. It would be reasonable to specify replacement where there is poor efficiency and signs of disrepair or repeated system failure, such as leaking radiators, corroded components and inoperative parts. If for example half of the radiators in a system need replacement, a complete new system may be cost effective. The condition, efficiency and capacity of existing radiators and pipe work should also be considered. Indicators of older central heating systems would be panel radiators without fins, gravity fed or partly pumped systems. Such systems will also be less likely to have controls such as TRVs and may lack other temperature and timing controls. There may also be a lack of independent control between heating and hot water systems.

In the specification of works, any part replacement of a gas heating system should include the need for full cleaning of the system e.g. a powerflush and use of appropriate inhibitor in the system.

Appendix 5 includes more details on boiler capacities, running costs of boilers and assessing the heat outputs for heating appliances.

In all cases, it is important to take account of the practicality of repair and the costs involved. This is especially relevant where the cost of specifying a new heating system is compared to the cost of repair and improvement of existing systems. The costs of repair, renewal and alternative heating provision has been a major consideration in several Residential Property Tribunal cases (see summaries in the forthcoming NEA Guide) and practitioners are advised to ensure that they have carried out a detailed consideration of the cost of specifying remedial works and the alternatives that are available. There should be a robust justification for the remedial works that have been included in schedules of work.

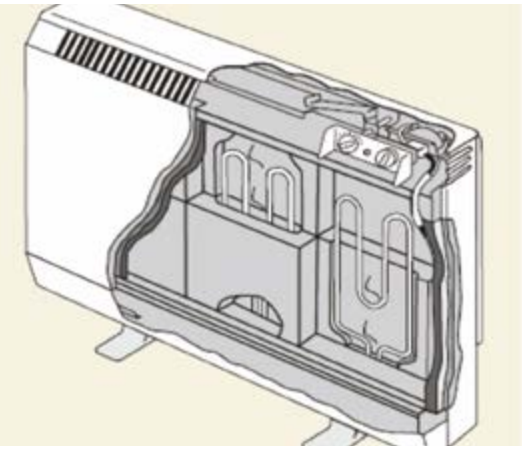
Worked Example 6 is a case where there were no grounds for replacing a 15 year old system with good controls which was working efficiently.

5.4 Electrical heating systems

5.4.1 Background

In general electricity is more expensive than other heating fuels, however the cost of installation of electric heating systems with storage radiators and direct acting heaters will generally be lower than for a gas fired central

5 Heating



heating system. The running cost of heating with electricity will be significantly higher than with other fuels, however a high proportion of off-peak electricity will reduce the cost.

Higher standards of insulation will be necessary with electric heating systems than with gas. Electric heating systems should not be specified in premises with large areas of wall with low levels of insulation such as un-insulated solid walls typically found in older properties.

Electrical heating systems are unlikely to be considered as 'appropriate heating provision' unless the premises are small and well insulated (e.g. built after 1979) or in HMOs, see Appendix 6. For the purposes of this guidance, electrical heating systems would only be considered as suitable to mitigate an excess cold hazard where:

- It is not practicable to install a cheaper fuel supply an such as gas or oil at the premises; or
- The dwelling has a low heat demand, because it is small and not very exposed, and a good standard of insulation exists or can be achieved.
- There is existing electrical storage heating and it can be improved to a reasonable standard. (The feasibility and cost of extending or improving the system should be compared with that of installing a central heating system.)

The Energy Saving Trust publication Domestic heating by electricity provides further technical information.

It is essential to remember that electrical heating should only be specified for a well insulated building or where additional insulation is also specified.

5.4.2 Storage heaters v on peak heaters

A storage heater contains heat-retaining blocks that are heated up overnight usually using off-peak electricity. They are manufactured in a range of sizes with storage capacity quoted in kWh. They perform better in well-insulated draught-proofed homes, where heat loss from the building is lower and is less affected by sudden changes in the weather. They are charged with heat during off-peak periods at night and release it slowly over longer periods during the day.

Storage heaters are unable to respond rapidly to changes in demand, but more modern ones have controls to set the amount of heat they are charged, depending on the outdoor temperature, and have variable emission rates. A lack of controls to set overnight charging correctly leads either to insufficient storage for the next day's requirements or to an excessive amount that will be wasted if milder weather reduces heating needs.

Storage heaters run on off-peak tariffs are not ideal for the following reasons:

- The heat output will always be running 24 hours behind as they are not very adaptable to daily temperature variations.
- When the outdoor temperature is very low, especially during the evening the heat may be inadequate so another form of heating is needed.
- They have high levels of static heat loss so heating may be provided when people are out and it is not needed.
- A lower tariff for night-time charging can be associated with a higher than normal tariff for all other day-time use.

The greater running costs of storage heaters with the necessary supplemental on-peak electric heating should be considered, to some extent, when selecting the heating to be specified. The high running costs may lead to the appliances not being used regularly enough to maintain a healthy indoor room temperature. However the relevant RPT decisions should be considered, see section 4.4 above.

See Worked Examples 2 for a house and 7 for an HMO

5.4.3 Existing storage heating

Where considering the retention of existing electrical storage heaters, decide whether they are of adequate capacity see Appendix 5. If so consider whether the controls are adequate and whether the existing level of insulation is sufficient and whether additional insulation can be specified. Where the heating cannot be upgraded, alternative fixed gas or oil fired central heating systems is likely to be a more suitable option.

The Westminster and Haringey RPT cases and Worked Example 2 concern the replacement of electrical storage heating with gas central heating. Also Worked Example 7 is about the replacement of poor storage heating with upgraded storage heating or controllable gas central heating and Worked Example 4 concerns the replacement of fixed electrical heaters with full gas central heating system

5.4.4 Specifying storage heating systems

Where an electrical storage heating system is to be specified in a schedule of remedial works, it should meet the following requirements:

- Adequate heating should be provided to all parts of the premises. It should be based on a combination of storage heaters and ideally fixed modern panel type electric heaters.
- A reasonable proportion of the heating should be provided at off-peak rates, a target of 90% is recommended.
- Time controls and automatic input and output charge controls, with an internal or external temperature sensor (which is used to set the amount of heat to be stored automatically) should be provided. Alternatively, the heating system should be managed from one central unit with time and temperature programming, with separate zones for living and sleeping areas, for example CELECT-type control. This enables more precise control of individual heaters throughout the dwelling.

A clause should be included in the schedule of works to ensure that the storage heating system is correctly designed. The TEHVA Guide provides guidance on designing storage heating systems.

The electrical installation may need to be upgraded to cope with the increased load. This may add considerably to the cost of the heating system.

5.8 Individual Room heaters

A wide range of types of fixed individual room heaters are available including electric convector panels (pictured) and radiant heaters. They may also be fuelled by gas, heating oil, LPG or solid fuel. They are usually highly responsive to immediate heating needs and tend to be expensive to run. So in general, they can only be considered suitable as supplementary heating and sometimes in bedsit type HMOs, see Appendix 6. Where electric heaters are specified they should include a timer and thermostat.

5.9 Warm Air Heating

Warm air heating can be fuelled by gas, LPG, oil or electricity. The heat is distributed around the dwelling through duct work; individual grilles usually have sliding 'dampeners' which open and close to help balance the heat distribution. For gas warm air systems, gas is burnt to warm up a heat exchanger and air is drawn over the heat exchanger. Electric warm air units work on a similar principle as storage heaters. A heat-retaining block is heated overnight using off-peak electricity. Replacement units are available, but greater savings will usually be made by specifying a new fixed gas central heating system where possible.

5.10 Under floor heating

Under floor heating systems provide background heat and are usually powered by electricity or a gas boiler; they tend to be difficult to maintain. In general, only the most modern under floor heating systems could be considered to provide adequate heating and they would need to be supplemented with individual room heaters. See Worked Example 3 involving older inefficient under floor heating system.

6 Insulation

6.1 Background

Insulation reduces heat loss from buildings and is a key element of remedial measures to address excess cold hazards. Additional insulation may need to be specified as part of remedial works for excess cold hazards where a deficiency in the insulation has been identified, or where electric heating is to be installed and additional insulation is needed.

The Operating Guidance, Annex D, paragraph 2.19 states for the preventative measures and the ideal that, 'Structural thermal insulation should be provided to minimise heat loss. The level of insulation necessary is in part dependent on geographical location and exposure, position in relation to other dwellings and buildings, and orientation.' For insulation, the guidance specifically states that, 'inadequate insulation of the external envelope of the dwelling' is a relevant matter affecting the likelihood and harm outcome.

Where other building works involve the renovation or replacement of any thermal element the Building Regulations Approved Document L2 requires insulation to be provided.

The following guidance suggests remedial measures to address deficiencies to the insulation to the external envelope of dwellings including walls, roofs, windows and floors.

6.2 Roof insulation

6.2.1 Loft insulation for pitched roofs

Where a deficiency in loft insulation has been identified it would be appropriate to specify the installation or upgrading of loft insulation to comply with the Building Regulations. Where access to a roof space is not available, provision of an insulated loft hatch should be included in the schedule of remedial works.

Insulation should be specified to include around (but not beneath) water tanks and pipe work to prevent freezing and filling all holes at ceiling level to include areas penetrated by pipe work, to prevent moist air condensing on cold surfaces in the loft.

Where the provision of roof insulation is specified, it is essential that there will be adequate provision for ventilation. This should be included in schedules of remedial works, where provision is inadequate see Building Regulations Approved Document L2.

6.2.2 Habitable Roof Spaces

Where there is a habitable roof space and the roof covering requires renewal, insulation can be provided either by expanded polystyrene boards or insulation slabs fitted between the rafters or, for a flat roof, by the use of pre-insulated decking boards. The amount of insulation that can be installed will depend upon the depth of the existing rafters/joists. Semi-rigid insulation slabs are generally available from a depth of 50mm, so will be suitable for a rafter/joist depth of 100mm. Rigid slabs can be found of a depth of 35mm, so would be acceptable for a 75mm depth rafter/joist leaving an air gap of 40mm.

It is not easy to achieve the thermal insulation ('U' values) in the Building Regulations for loft rooms and a number of methods may need to be specified to reach the standard e.g. insulation between and under the rafters. The package of remedial works as a whole will need to be adequate and reasonable to mitigate the excess cold hazard.

Where the existing roof covering is in good condition, insulation should be specified as being provided from below by either:

Removing the ceilings/spandrel/wall linings and fitting a rigid/semi-rigid board/slab between rafters/joists/studs and then forming a new ceiling with a 50mm air gap or;

Over-boarding the existing ceiling and walls with thermal-board incorporating a vapour barrier or;

Forming a suspended ceiling with insulation, as part of an overall solution for a pitched roof or a complete solution for a flat roof.

The solution specified will depend upon the depth of the rafters/joists and the overall headroom. The re-covering of a roof would usually require Building Regulation approval, so practitioners should have regard to these requirements when a thermal element is being renovated or replaced.

See worked example 1.

For mansard roof insulation see worked example 9.

6.2.3 Flat roofs

Where a flat roof covering is not defective, additional insulation should be installed below the roof covering, using a cold deck solution. The specification should include:

Removing the ceilings, fitting insulation between the joists and then forming a new ceiling with a 50mm air gap.

- Over-boarding the existing ceiling with thermal-board or;
- Forming a suspended ceiling and providing insulation above it.
- Adequate ventilation must be provided above the insulation where a flat roof is a cold deck or where the roof is pitched and the insulation is placed between the rafters.

Where the roof covering or deck is defective, a warm deck method of insulation should be specified. Mineral fibre (or equivalent resistance) insulation should be provided or it should be upgraded to a minimum depth of 100mm, subject to compliance with the current Building Regulations. Be sure to include any insulation likely to be damaged or removed as a result of the remedial works. A high-performance vapour control layer should be specified to be bonded or mechanically fixed to the deck with joints sealed in hot bitumen. The new weatherproof covering needs to be finished in white chippings or solar reflective paint to prevent solar deterioration. Adequate ventilation should also be included in the schedule of remedial works.

6.3 Wall insulation

6.3.1 Cavity Wall Insulation.

The provision of cavity wall insulation can result in heat loss through walls being reduced by up to 60% and after loft insulation it is the most cost-effective insulation measure. So it would be an appropriate measure to specify where an excess cold hazard has been identified and unfilled cavity walls are present. Insulation of cavity walls should be carried out by a member of the National Insulation Association, which has a register of proven systems and installers on its website.

6.3.2 Solid Wall Insulation

A solid wall can be insulated either internally using dry lining or externally using wall cladding, but both provide practical challenges. Solid wall insulation should only be specified when addressing the excess cold hazards where there is a large external wall area or there are other remedial works to address, such as dampness. Internal dry lining is generally the preferred option, but both can be costly.

Internal insulation consists of either dry lining in the form of laminated insulating plasterboard fixed on a studwork frame or a flexible thermal lining. A vapour barrier is required on the room side of the insulation to prevent interstitial condensation. Skirting boards, door frames and electrical fittings will all need to be re-positioned. Care must be taken to avoid piercing the vapour barrier. Internal insulation causes a reduction in the size of the room; this can be critical in smaller rooms and should not result in a reduction of more than 5% of the floor area. The tenants' wishes should be considered as the room size will be reduced and the installation will cause significant disruption.

External insulation systems are made up of an insulation layer fixed to the existing wall and a protective render or cladding finish. External insulation has long payback time unless installed in conjunction with other remedial work. It has the benefits over internal insulation of not causing disruption to tenants or reducing internal space floor area but it is costly and the installation is more complex than internal insulation. It should only be considered for inclusion in schedules of work in the following circumstances:

- In premises where there are considerable areas of exposed external façade, such as semi-detached or detached premises, particularly premises with existing external render, and
- Where a significant area of the façade is in poor condition, or there is a need for reconstruction of part of the external envelope of the building, or
- Where the premises requires major building works affecting external walls e.g. where there are problems relating to poor structural design such as thermal bridging.

6 Insulation

Planning consent should be sought for any change in external appearance where the dwelling is a listed building, in a conservation area or has fine architectural detailing.

See Worked Example 7 – Insulation of two walls to bay of older style house.

6.4 Floor insulation

Insulation measures can significantly reduce heat loss through floors. Floor insulation is most effective for exposed dwellings with large ground or basement floor areas e.g. detached premises and for suspended floors with butt jointed boards, where draughts can be a significant issue. More heat is lost along the perimeter of the floor near to external walls.

Ground floor insulation should generally only be included in a schedule of works where there are other related hazards (such as dampness and mould growth, electrical safety or falls) which require the floor surface or structure to be exposed or access is easy. For example where removal of floorboards would be required for other reasons or where floors can be easily accessed from below e.g. cellars.

In the cases where floor insulation is to be specified for suspended wood floors, this can be achieved by laying mineral wool insulation supported by netting between the joists. In addition to the insulation, sealant can be used to fill any gaps between floorboards and skirting boards (care must be taken not to block under floor air vents). If it is not appropriate to fully insulate the floor then sealant can be used on its own as this will reduce heat loss.

6.5 Window insulation

For existing single glazed windows, it is appropriate to specify that remedial action is carried out to rectify any minor defects e.g. cracked panes, draught-proofing and rotten timber that contribute to the hazard.

Where windows are beyond repair and causing serious draughts and excessive heat loss, it would be appropriate to specify their replacement. Here it would be cost effective to require double glazed windows to be installed. There are Building Regulations requirements for the replacement of windows and planning requirements for the replacement of windows to listed buildings or buildings in conservation areas. (It is recommended that new double glazed windows should have a C rating or above on the BRFC rating scheme.) Councils should also consider their specifications to encourage the use of products which meet their standards for sustainability/ environmental strategies etc.

Where there are exceptionally large areas of glazing secondary glazing could be considered for inclusion in the remedial works, it is more cost effective than double glazing. The number of single glazed windows, their surface area, condition and size, will be a relevant considerations.

See Worked Example 8 which suggests double glazing for large window areas where there is a major contribution to heat loss (60% glazed area of total wall).

6.6 Dwellings of non-traditional construction

Where dwellings of a non-typical or non-traditional construction have a category 1 excess cold hazard there may be justification for specifying works which 'extend beyond' removal of the category 1 hazard. When assessing non-traditionally constructed dwellings, the major issue of concern will be any poor thermal insulation afforded by the wall structure. Whilst it may be relatively simple to specify an appropriate heating system and insulate a loft space, these may not be appropriate if the wall structure of the building provides poor thermal insulation with little practical scope for upgrading. The practicality of remedial work and the cost will have been major considerations during the appraisal of the enforcement options to determine the most appropriate course of action.

The construction of the premises will determine how it can be effectively insulated and this may result in a different specification of works compared to what would normally be expected for more traditional construction. It is also important to recognise that the reduction in the hazard score following works may not be as great as would normally be achieved. See Worked Example 5 for further guidance.

Where deficiencies arise from ventilation there is a need to specify improvements to the ventilation to reduce heat loss and draughts. The aim is to provide adequate ventilation which can be controlled.

7 Ventilation

7.1 Draught Proofing

Draught stripping of external doors, windows, and loft hatches are simple measures which could be included in schedules to deal with deficiencies regarding draughts. Draught proofing is a cost effective measure with a typical payback period of 5 years or less in terraced houses.

Doors are a major source of draughts and should be draught-proofed as a priority. Letter boxes should be fitted with a draught-proof cover to reduce draughts.

The specification for draught proofing should ensure that any measures are specifically designed for the type of window or door being treated, as different seals are designed to cover different sizes of gap. Proprietary seals specifically designed for the type of window or door being treated should be specified where appropriate to be installed in accordance with manufacturer's instructions. Schedules of works should generally require more durable rigidly fixed seals rather than self adhesive draught strips.

Where draught stripping is specified in bathrooms and kitchens, practitioners should ensure that a clause is included stating that once the measures have been carried out, there will be adequate ventilation in these rooms to prevent condensation. The specification should also state, where appropriate, that adequate permanent ventilation must be provided to permit the entry of combustion air for all open-flued heating and hot water appliances, including open fires.

Loft hatches should be draught proofed to prevent warm moist air entering the roof space. Disused chimneys and flues are a major cause of heat loss and should be a priority for action. Any works to seal up such elements should include a clause to ensure that adequate ventilation is provided to prevent condensation.

It is appropriate to specify the sealing of gaps, cracks and voids in the building fabric, especially where there is excessive ventilation or uncontrolled draughts to external walls.

7.2 Mechanical Ventilation

Repairs to existing mechanical ventilation systems and the upgrading of inadequately designed units should be included in schedules of works where they can deal with any deficiencies identified. Specification of new mechanical extraction should normally be limited to cases where excessive condensation and mould have been identified under the damp and mould growth hazard. In these circumstances, controls including humidistats and timers can be specified.

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8 Conclusion

Since the publication of the Operating Guidance, there have been significant improvements in the energy efficiency of homes and more recent evidence indicates that fewer excess winter deaths are caused by poor housing conditions. This means that the average dwelling is now significantly less likely to be category 1 hazard for excess cold. However excess cold continues to be one of the most common of all category 1 hazards and there will still be a substantial number of private rented dwellings with excess cold hazards, where the landlord is not willing to carry out the necessary repairs and their tenants may be living in fuel poverty. The fact that the average dwelling is no longer a category 1 hazard, will help practitioners to focus on the more serious cases.

Practitioners need to take into account the recent evidence, as well as the Operating Guidance, when assessing whether a category 1 or category 2 hazard exists. Where a notice is to be served to deal with an excess cold hazard, the deficiencies of the existing provision of heating, insulation and ventilation need to be considered before the remedial works can be specified. The most common remedial measures will be the installation of central heating, some loft insulation and draught stripping. However it is important to consider how the deficiencies found in each dwelling should be remedied, taking the cost and practicality of the remedial works into account.

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Appendix

List of Appendices

Appendix 1 – Checklist and survey form

Click to download

Example of Word document

Excess cold checklist and survey form

The checklist and survey form are included below as alternatives for use when surveying a dwelling for an excess cold hazard.

Checklist

Heading	Elements to consider		Notes
Construction	Date of construction		
	Type of dwelling (mid-terrace, flat, detached etc.)		
	External wall construction (solid/cavity), thickness, and number		
	Main roof type (pitched, butterfly flat, mansard)		
	Back addition roof type (pitched, butterfly flat)		
	Ceiling heights unusually high or low.		
Heating system	Gas, oil, electric, off-peak electric?		
Central heating	Full or partial (if partial how many rooms)		
C/h boiler	Make & Model number		
	Type: normal (with h/w cylinder), combi condensing, back boiler		
	Controls	Timer?	
		TRVs?	
		Cylinder thermostat?	
		Room thermostat?	
	Any concerns about size of radiators (if so note profile and dimensions)		
If storage heaters	Positions (rooms)		
	Make e.g. Dimplex		
	Model number usually on top (e.g. Dimplex CLXS 18)		
	Combined convector heater?		
Fixed heaters	Type, rating (Kw), ownership, controls, fixed/free standing		

Thermal Insulation	Main roof space		
	Back addition roof space		
	Flat roof – (added insulation unlikely)		
	Solid external walls lined? ('tap', ask tenant)		
	Below suspended timber floor?		
	Cold bridges'	Concrete lintels above doors/windows,	
		Floor slabs extending to outer leaf of external wall?	
Windows	Single/Double, 2^{y} glazing -		
	Frame type (wood, metal, upvc)		
	Draught proofed or loose/draughty? Disrepair		
	Any large glazed area as approx % of external wall area		
Ventilation	Absence or type of background ventilation (air bricks, trickle vents etc.)		
	Presence & condition of mechanical ventilation? (length of ducting, number of bends) Sufficient extract rate?		
	If cooker hood present - Extract or recirculate?		
	Presence of open flues		
Orientation	South facing glazing		
	Areas of over shading (adjacent buildings, balconies, trees etc)		
	Areas of greater exposure (higher floors, overlooking open space)		
Damp/ disrepair	Does it contribute to excess cold?		

Information from occupiers	How much do they use heating system?	
	Do they experience cold, are fuel bills higher than average?	
	Any cold related illness?	
	Neighbours experience similar problems?	
	Building history and repair record, cavity insulation etc,	
	Any other information? – eg EPC	

Excess Cold Survey Form

Address: _____

Date of survey: Name of surveyor:

Date of construction of dwelling _____

Checklist: tick or circle and enter details as appropriate

Roof	Main Building	Back Addition	Extension	Other…..
Pitched				
Mansard				
London or Butterfly				
Flat				
Thermal Insulation				

Wall	Main Building	Back
Solid thickness? cavity ? Cavity filled? date?		
Additional Insulation External: i.e. cladding Internal: i.e dry lined? quality?		
Evidence of Cold Bridging		

Ground Floor (Solid / suspended timber, insulated?)		

Common Parts (Hallways / Staircases)	Note presence of windo
	Note presence of heati

Room Details

Checklist: tick or circle and enter details as appropriate

Room (s) Use i.e lounge, bedroom, bedsit, kitchen, bathroom, utility. Location i.e B G F S T F etc	**Windows(s)** Indicate type: casement sashes, … other Frame: wood, metal or uPVC. Glazing: single, double, secondary. Background Vent: Trickle vent. Draught proofed? % window area to wall area	**Ventilation** Indicate Type: Mechanical Humidstat Cooker hood (extract / recirculation).		**Space Heating** Fuel type / Heating System (and associated controls) / central heating /communal/ on peak / off peak/ storage/ room heaters / fires		
Note number of exposed walls if any	Indicate number of windows, window size		Type	Make / Model	Controls	Adequate? Tick/cross

Boiler (gas/ oil/electric, traditional/combi/condensing make, mode Controls: programmable, timer? Room thermostat etc.	**Hot Water System** from boiler, if not gas/ oil/electric back boiler/ immersion,; make, mode any hot water cylinder, insulation jacket to hot water cylinder. Programmable, timer? / Cylinder thermostat.

Information from Occupiers and other comments fuel poverty, cold related illnesses, building history, repair, use of heating system, ventilation any cavituy wall/roof insulation

Damp/disrepair contributing to excess cold:
Guidance all aspects of thermal performance factors to be considered, heating; insulation; ventilation; disrepair

Average	Assessment is it?	Ideal
• presence of gas central heating • basic loft insulation • no additional wall or floor insulation	• WORSE THAN AVERAGE? • AVERAGE? • BETTER THAN AVERAGE	• Full gas central heating, with programmable controls, (room thermostat and thermostat on all radiators) • Insulated loft space (pitched roof min 275mm

Appendix 2

Standard clauses for deficiencies which may give rise to excess cold hazards

The deficiencies listed below are suggestions, they do not form a comprehensive list of deficiencies associated with excess cold hazards.

Heating

- The current [insert current provision for heating e.g. radiant bar heaters, or portable electric heaters] is

  [inadequate / inappropriate / inefficient / not of adequate capacity / unsafe / not sufficiently controlable]

  to achieve and maintain an adequate indoor temperatures throughout the dwelling during cold weather.
- The current provision of electric night storage heating running off an economy tariff without an addition "convector boost" or dual heat facility means that there will be inadequate heating late in the day and evening during cold weather.

Insulation

- The [loft / roof] space does not contain the required 275mm of insulation throughout to prevent excessive heat loss from the property.
- It is unknown whether the existing insulation to the [loft / roof] space contains the required 275mm of insulation throughout to prevent excessive heat loss from the property.
- The existing insulation to the [loft / roof] space contains significantly less than the required 275mm of insulation throughout to prevent excessive heat loss from the property.
- It is not known whether the cavity walls are insulated to prevent excessive heat loss from the property.

Damp

- There is dampness to XXX affecting the thermal insulation to XXX, it will therefore not function adequately to prevent excessive heat loss from the property.

Walls

- The [dwelling / XXX room] has a greater than average area of [exposed external wall / glazing], which is not adequately insulated to prevent excessive heat loss.
- The external wall(s) to XXX are of [single brick thickness / XXX construction] which does not provide adequate insulation to prevent excessive heat loss.

Windows and Doors

The [window / door] to XXX room

[is ill-fitting / is in disrepair / is particularly exposed / has broken glazing / is of such a design]

that it causes excess draughts which prevent adequate thermal comfort.

Appendix 3

The average HHSRS scores for excess cold

1. Winter deaths

The average HHSRS scores for excess cold were derived from cold/winter related mortality, the incidence of cardiovascular and respiratory illness and research that looked at the relative risks of mortality associated with different dwelling types (Statistical evidence to support the HHSRS, volume 3).

The published HHSRS averages are derived from cold/winter related mortality (excess winter deaths). The high class 1 excess cold harm outcome average (34%) was based upon a figure of 40,000 excess winter deaths, which typically existed in the years in which the published averages were based. However, in the years that have passed since 1999, the annual excess winter deaths figure has tended to be considerably lower than 40,000, generally close to 25,000.

It is the case that the reduction in cold/winter mortality could be explained by the relatively mild winters that have existed for the most part since 1999, rather than being a reflection of the corresponding improvements that have occurred in the energy efficiency of the stock over the same period.

The annual cold/winter mortality figures are published by the Office for National Statistics (ONS). Each annual report states that the incidence of excess winter deaths for that given year was attributable to average temperatures, the level of disease and "other factors".

Looking at the last two sets of published figures: Winter of 2008/09 – this was the coldest recorded winter since 2005/06 and the number of recorded excess winter deaths rose to 36,700

Winter of 2009/10 – this was the coldest recorded winter since 1995/96 but the number of recorded excess winter deaths fell to 25,400

The reasons for this apparent disparity in the excess winter death statistics, whereby a colder winter in 2009/10 produced 30% fewer deaths than in the previous winter, were addressed in an ONS report (November 2010). The report, excess winter mortality in England and Wales, 2009/10 (provisional) and 2008/09 (final) points out that winter mortality is not mostly caused directly by conditions related to the cold, such as hypothermia.

The majority of additional winter deaths are caused by cerebrovascular diseases, ischaemic heart disease and respiratory diseases. Exposure to cold or influenza infection can be fatal to people who are already vulnerable because of these pre-existing health conditions. The lower level of excess winter deaths in 2009/10 were justified on the basis that, during this particular year, there were low levels of influenza for most of the winter. This was contrasted with the winter of 1999/2000, which produced the highest recorded excess winter deaths figure in recent years. In this year, influenza reached epidemic levels in a relatively mild winter (ONS News release 23 November 2010)

2. Energy characteristics of the Housing Stock

The Operating Guidance based its statistics for the energy efficiency of the housing stock on the 1996 English House Condition Survey (EHCS) report. it reported that: -

- The average SAP of the housing stock was 42.
- Central or programmable heating systems were present in 88% of dwellings, although these systems were over 30 years old in 2% of these cases.
- Single purpose gas boilers were present in 63% of dwellings that had a form of central heating, with gas back boilers present in 14% and Electric storage heaters in 9% of dwellings. The remaining 14% of dwellings included a range of less common, and often less efficient, systems including gas ducted air (3%), solid fuel (3%) and electric floor/ceiling (1%)
- Just over 10% of dwellings relied upon fixed room heater(s) as their main source of heating with just over 0.5% having no fixed heating at all
- 93% of dwellings that had a loft space above them had some level of loft insulation although only about 1 in 6 of these had 150mm or more present (Building Regulations standard at that time)
- Of those dwellings that had cavity walls, 22% had filled cavities
- 59% of all dwellings had some double glazing, with about half of these dwellings having full double glazing.

Appendix 3

The most recent national energy statistics were published in October 2010 (English Housing Survey 2008). The report concluded that there had been a "substantial improvement in the average energy efficiency of dwellings in all tenures between 1996 and 2008". It reported that:

- The average SAP of the housing stock was 51.
- Central or programmable heating systems (all kinds) were present in 96.7% of dwellings, including 7.4% dwellings that relied upon programmable storage heating. The remaining 3.3% of dwellings relied upon room heaters/portable heating appliances
- Of those dwellings with a form of central heating, an increasing proportion of boilers were condensing boilers (17% of all dwellings in 2008) replacing less efficient heating systems (back boilers, standard boilers, warm air systems) that were more prevalent in 1996
- 96-97% of dwellings that had a loft space above them had some level of loft insulation with 38% of these having 150 mm or more present
- Of those dwellings that had cavity walls, 48% had filled cavities
- The proportion of dwellings that had full double glazing was 71%

The EHCS figures show that the energy efficiency characteristics of the average dwelling have changed since 1996.

The Operating Guidance on excess cold gives average likelihoods for both "non HMOs" and "HMOs": "Non-HMOs" consist of purpose built flats and houses and "HMOs" consist of all non self-contained shared/bedsit type accommodation and self-contained converted flats. The majority of dwellings in the HMO category are self-contained converted flats, it is reasonable to conclude that the "average" characteristics of "HMOs" and "non HMOs" are essentially the same for HHSRS excess cold assessment purposes. Typical energy efficiency characteristics for the average dwelling in 2008 are described in the table 2.

Although the HHSRS averages for excess cold in the Operating Guidance are tenure neutral, it may be worth highlighting the differences in dwelling energy efficiency characteristics that exist in the different housing tenures, see Table 3.

There have been considerable improvements in the energy efficiency of the average dwelling since the Operating Guidance was published. Table 3 illustrates that the average SAP has risen from 42 in 1996 to 50 and from 38 to 48 in th Guidance provide an over-estimate of the potential for harm, due to improvements in energy efficiency since publication.

Furthermore, the average SAP varies considerably with age of dwelling, as seen in the Table 4.

In addition, within the "HMO" category, dwellings that are non self-contained bedsit accommodation will have a higher incidence of on peak electric heating than self-contained flats and are likely to be worse than the "average HMO". However, it is the case that heat loss from such units will often be lower, due to their having less wall area exposed to the external.

Although practitioners should have regard to published HHSRS averages, it should not be assumed that a dwelling has a category 1 excess cold hazard simply because it is considered to have "average" energy characteristics.

Much of the attention of practitioners in terms of the published HHSRS excess cold averages has focused on older stock, the published averages also suggest that the "average" newer dwelling also poses a significant excess cold hazard. However, these averages, based upon the relevant mortality statistics for these dwelling age/types, cannot be easily reconciled with the known energy characteristics of the stock. "Average" relatively modern dwellings have similarly high average HHSRS scores to much older and generally less energy efficient dwellings (see table comparing dwelling age with SAP, above). This also adds some further weight to the recent research that suggests fewer excess winter deaths can be attributed to dwelling energy efficiency characteristics than was previously thought and allowed for in the published HHSRS excess cold averages.

Table 2:
Typical energy efficiency characteristics for the average dwelling

Source: Energy Efficiency Best Practice Programme : 'base case' CE189, Refurbishment of Dwellings – summary of best practice (2006), Central Heating System Specifications (CheSS) 2005.

Insulation	Ventilation
• Un-insulated solid brick walls • Un-filled cavity walls (pre-1976) • 100mm loft insulation • Un-insulated flat roofs • Un-insulated ground floors • Partial or full double glazing	Background: • Equivalent of standard air brick in habitable rooms Rapid • Openable windows • Extract fans in internal kitchens and bathrooms No draught proofing to windows and doors
Heating	
Gas	**Electric**
• Central heating • Boiler 67% efficient (Energy Band D) • Room thermostat and timer (no interlock) • No TRVs • 55mm insulating jacket on a 120 litre cylinder (stock average) • Cylinder thermostat	• Central heating • "Slimline" storage radiators with manual controls • Secondary heating from "on peak" panel heaters • 55mm insulating jacket on 120 litre cylinder (stock average) • Not dual immersion

Table 3:
Source EHCS 2008 private rented sector between 1996 and 2007. It is therefore apparent that the average likelihood and health outcomes specified at paragraph 2.02 in the Operating

Energy Efficiency, average SAP rating by tenure, 1996–2008

	1996	2001	2003	2004	2005	2006	2007	2008
owner occupied	41.1	44.4	45.0	45.6	46.1	46.9	48.1	49.6
private rented	37.9	41.9	44.4	45.7	46.0	46.6	48.1	50.2
all private	40.7	44.1	44.9	45.6	46.1	46.8	48.1	
local authority	45.7	49.6	52.0	53.9	55.3	55.8	56.2	58.0
RSL	50.9	56.4	56.7	57.3	58.9	59.3	59.5	60
all social	46.8	51.9	53.9	55.3	56.9	57.4	57.8	
all tenures	42.1	45.7	46.6	47.4	48.1	48.7	49.8	51.4
Base: all dwellings								

Table 4:
Mean SAP by dwelling age (EHCS 2008).

Dwelling age	Pre 1919	1920-1944	1945-1964	1965-1980	1981-1990	Post 1990
Mean SAP	42.2	46.9	50.9	53.9	57.3	65.5

Appendix 4

A summary of the Building Regulations requirements for heating

The Building Regulations Approved Document L1B: Conservation of fuel and power (Existing dwellings) (2010 edition) contains the requirements for heating works carried out in existing dwellings. The following is a summary of the requirements, but the source documents should be used for more detail and where legal accuracy is required.

Anyone carrying out building work on an item of a property controlled by Building Regulations is required to assess its performance with regard to the conservation of fuel and power. This involves ascertaining if the controlled item, for example an external wall, meets the requirements of building regulations, and when required, carrying out energy efficiency improvements (such as the addition of insulation) where this is technically, functionally and economically feasible. Minimum standards are set by building regulations regarding fixtures and fittings which are being worked on, added or replaced.

The Building Regulations aim to prevent a heating appliance being replaced by a less efficient one. They apply to new or replacement primary appliances in existing dwellings. Heating appliances must have an efficiency of not less than that shown in the Domestic Heating Compliance Guide (DHCG) depending on the fuel source. Where an appliance is replaced by one using the same fuel or energy supply, the seasonal efficiency of the new appliance should be as stated in the DHCG and be no less than two percentage points lower than the existing one. In addition the system must be provided with:

- Boiler control interlock where the controls are wired so that the boiler and pump are switched off when there is no demand for heat.
- In larger properties, at least two space heating zones which are controlled separately.
- A programmer capable of timing the space heating separately to the hot water system, so that the boiler only operates when required.
- Temperature controls e.g. thermostatic radiator valves or room thermostats.
- Motorised valves to provide independent control of heating
- Primary circulation pipe work should be insulated.
- Systems for space heating should have a fully pumped circuit, separate to the hot water circulation
- System should be thoroughly cleansed and flushed before the new boiler is commissioned and a suitable chemical water treatment added.

New boilers should be condensing boilers, but exceptions can be made where determined by an assessment of the property carried out by a competent person.

Appendix 5

Sizes for heating appliances and boilers and fuel costs for boilers

The following table shows the heat appliance size required for rooms of different type and size, This indicates that, for the most commonly found living rooms and bedrooms, a 3kW (or equivalent) appliance with thermostatic control and programmer/timer (on appliance or system) would provide an adequate heat output.

Table 5.1: Output of heaters required for typical rooms

Room Type	Floor Area (m^2)	Heater Appliance Size Required (KW)
Living Room	Up to 10	1.6
Living Room	11-15	2.4
Living Room	16-20	3.15
Living Room	21-25	3.9
Bedroom	Up to 10	1.4
Bedroom	11-15	2.1
Bedroom	16-20	2.8
Bedroom	21-25	3.5

For more details for electrical appliances see http://www.homesupply.co.uk/radiator_output_calculator.php or Dimplex.

Boiler capacity for gas central heating systems-Assessing the and efficiency

The SAP website provides a comprehensive boiler efficiency database from which information on boiler installations can be obtained:

The details of the boiler manufacturer and model in the property should be obtained. It is normally clearly stated on the boiler casing. For more information about boiler information, click on the "Explanations of the boiler data" tab on the site. Once the information on the boiler has been obtained, the efficiency and age of the boiler can be obtained from the "View the boiler efficiency database". The boiler efficiency can then be compared against the following table from the website, to give an indication of seasonal efficiency and cost:

Typical Annual Fuel Costs

Table 5.2: Typical Annual Fuel Costs

	Seasonal efficiency	Flat	Bungalow	Terraced	Semi-detached	Detached
Old boiler (heavy weight)	55%	£267	£341	£354	£397	£550
Old boiler (light weight)	65%	£231	£293	£304	£340	£470
New boiler (non-condensing)	78%	£197	£249	£258	£289	£396
New boiler (condensing)	88%	£178	£224	£232	£259	£355

Further information to support any deficiencies in the system can also be obtained from the SAP webite, including the energy efficiency band of the boiler, whether it is adequately sized for the property.

Each boiler will have a "GC" number which can be used to trace the exact model of the boiler if the manufacturer is known.

Appendix 6

Heating in HMOS

1. Introduction

For the average dwelling type and age, the Operating Guidance distinguishes between HMOs and non HMOs. 'HMOs' include traditional bedsits and flats in converted buildings. In terms of average scores for excess cold, the average HMO is very similar to the average non-HMO.

In many HMOs the assessment of the excess cold hazard is exactly the same as in a non-HMO, considering the issues of heating, insulation, ventilation and draughts. However, in bedsit type HMOs and HMOs where people live independently, the assessment of adequate heating is different. Decent fixed room heaters may be adequate, if the areas outside of the bedsits also have heating. In deciding whether the heating is adequate consider whether the lifestyles of the occupiers are varied with respect to the hours they are at home and sleeping.

Where each bedsit has an existing fixed heating appliance, any deficiencies should be identified and a decision made on whether the provision of a central heating system can be justified. In practice, where no central heating exists in a bedsit-type HMO, it is more likely that a full gas central heating system will need to be specified.

2. Central heating

The Operating Guidance on excess cold states at Annex D, paragraph 2.22, 'In multi-occupied buildings, provision for space heating may be centrally controlled. Such systems should be operated to ensure that occupants are not exposed to cold indoor temperatures and should be provided with controls to allow the occupants to regulate temperature within their dwelling.'

The heating system should provide direct heating to every room, including the common parts and shared bathrooms. The boiler and all system controls should be located in a common part, not in an occupier's room. These controls should either be accessible to all occupiers or only turned off for a few hours at night. The temperature would need to be controlled at other times using thermostatic radiator valves.

3. Fixed individual room heaters

The specification of fixed room heaters in bedsit HMOs to remedy excess cold hazards should not be dismissed out of hand. However it should be noted that according to the English House Condition Survey 2007 the HMO would be amongst the worst 5% of dwellings in England. Room heaters may be more typical for bedsit-type accommodation, but would be considerably worse than average for other types of HMOs.

In deciding whether fixed heating is, or would be adequate, consider the following factors for each bedsit:

1. The exposure and insulation of the external walls and windows and whether this can be improved.
2. The capacity of the fixed heating appliance.
3. Whether the heating is controllable, or would be able to warm the room up speedily from cold in winter.
4. Whether there is adequate heating to the common parts?

There are three types of room heaters to consider gas, on-peak electricity and off-peak electricity, see the main guidance for more details. Gas room heaters are very efficient, operating at typically 70 per cent efficiency. They may be considered as an appropriate form of heating provision in bedsit type HMOs where they exist or can be installed at reasonable cost.

The table opposite compares the different types of individual room heaters:

Table 6.1: Comparison of different types of individual room heaters

Appliance Type & Fuel	Disadvantages
Natural gas room heater	Simple on/off operation with no opportunity to program a heating cycle
Electric night storage heater (off-peak supply)	Due to charging cycle, are slow to respond to rapid temperature change and operate 24 hours "behind" Limited opportunity to program a heating cycle
Electric on-peak heater (with thermostatic heat settings and timer)	High running costs

Table 6.2 The comparative running costs of individual heaters.

One of the concerns over the use of room heaters is that of the running costs and how far this should be taken into account as a deficiency. The table below shows the comparative running costs of individual heaters.

Heating appliance type	Appliance Average Efficiency (%)	Expected Approximate Annual Appliance Running Costs (£)
Natural gas balanced flue wall heater	73	320
Natural gas radiant or convector fire	60	385
Natural gas decorative effect open fire	28	785
Electric off-peak storage heater	90	195
Electric on-peak fire	100	365

Derived from Sutherland Tables 2010.

The table shows that the running cost of an on-demand electric wall heater is similar to that of a gas wall heater and that an electric night storage heater is likely to be significantly cheaper than both.

The following RPT decisions are especially relevant to heating in HMOs:

Westminster City Council 2008

This case related to the provision of heating within an HMO comprising of flats and bed-sits. The local authority had stipulated gas central heating and the landlord wanted to install an off-peak electric system where the heating medium was oil rather than traditional "bricks". The main point of interest in this case was that the Tribunal considered that as long as a "heating standard" could be achieved then it was not reasonable for the means to do so to be restricted to a specific type of heating system. Having accepted the validity of the landlord's proposals, the Tribunal did, however, also consider that improvements to the single glazed windows would also have to be undertaken if the landlords proposed heating system were to be installed.

Bath & North East Somerset Council 2008

Here the tribunal reviewed the work required for the heating requirement that was to install electric night storage heaters with off peak electricity in each bed-sit and in the common areas and, in addition, to provide a modern panel type heater with timer and thermostatic control in each bed-sit. The tribunal considered that the provision of two heaters of different type was excessive as a mandatory requirement of work.

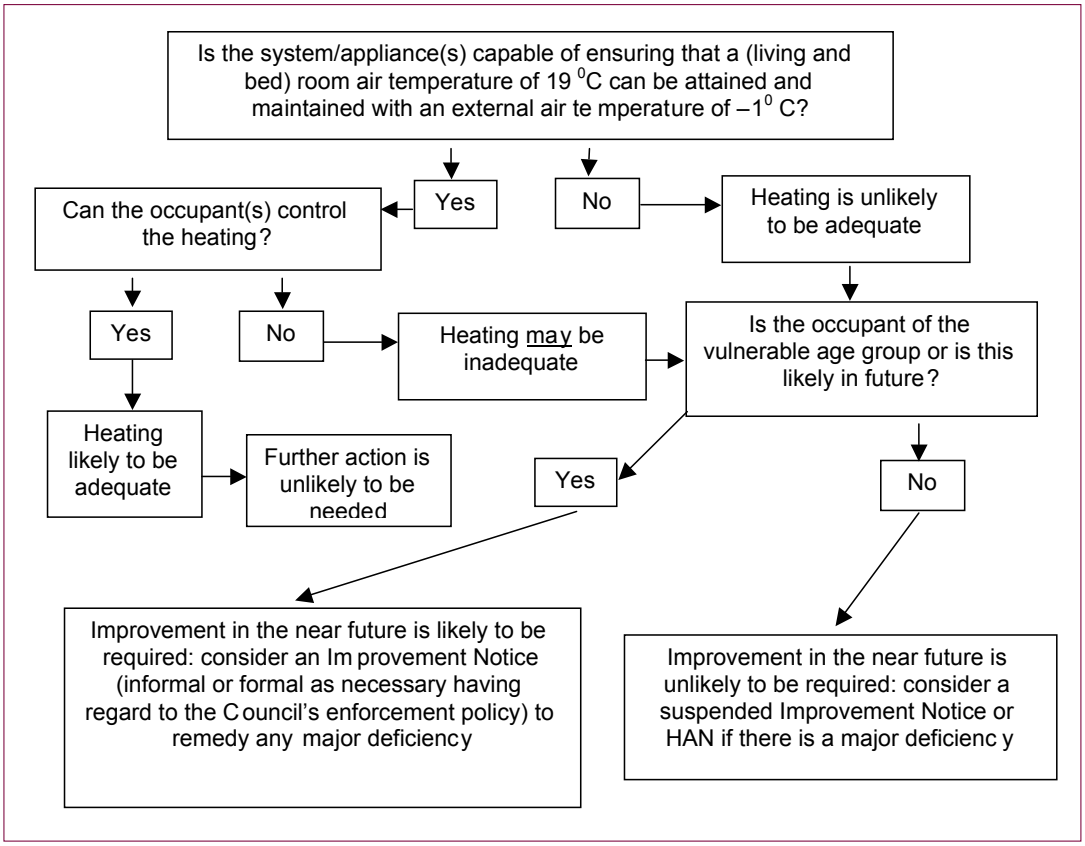
Appendix 7

Bristol County Council, Neighbourhood and Housing Services Decision note (Edited version)

Subject Reference:	HHSRS: Excess Cold and the provision of heating
Index Reference:	EDN91
Legislative Reference:	Housing Act 2004
Other References:	
This note should be read in conjunction with previous decision notes issued regarding the excess cold hazard	

Point of Issue: What is adequate heating?

This decision note has been revised following a number of RPT & Upper Tribunal (Land Tribunal) decisions. The following flowchart and table should be used as a starting point and then the full text of this note and the decisions referred to should be considered in reaching a conclusion as to whether or not any heating system should be considered adequate or not. Both are, by their very nature, rather crude but should help in identifying the general "direction of travel".



Heating System	Glazing	Wall	Loft insulation (min)
Gas central heating	Single glazing in good condition	Solid wall	150 mm glass fibre roll or equivalent
Gas central heating	Double glazing	Solid wall	100 mm glass fibre roll or equivalent
Relatively modern electric, off-peak, night storage heating*	Single glazing in good condition	Solid wall	250 mm glass fibre roll or equivalent
Relatively modern electric, off-peak, night storage heating*	Double glazing	Solid wall	200 mm glass fibre roll or equivalent
Individual "on demand" room heaters (whole house)	Single glazing	Solid wall	250 mm glass fibre roll or equivalent
Individual "on demand" room heaters (whole house)	Double glazing	Solid wall	200 mm glass fibre roll or equivalent
Individual "on demand" room heater (single room accommodation on upper floor)	Single glazing	Solid wall	250 mm glass fibre roll or equivalent
Individual "on demand" room heater (single room accommodation on upper floor)	Double glazing	Solid wall	200 mm glass fibre roll or equivalent

The above are illustrations of situations that should be sufficient to prevent a category 1 Excess Cold hazard assuming that the heating system/appliance is correctly sized and that no room has more than 2 external walls. Window size and ceiling height has been assumed to be of "typical" size.

* Consideration may need to be given to the need to have an additional on-demand heater in the main living room to maintain healthy evening room temperature

A number of RPT decisions have been taken into account in reaching the above conclusions rather than reliance solely upon HHSRS worked examples.

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Type of Heating

The optimum form of heating system should be regarded as a central heating system (the most typical form of heating) although relatively modern electric night storage heating must be regarded as an acceptable form of heating, whether or not the heaters have an on-peak boost facility.

In general terms regarding heating systems, in **LON/00BB/HIV/2008/0002** the Tribunal said it could not state that gas central heating has to be provided in a property, that it could only say that adequate heating was needed and that it was up to the landlord to choose the form of heating provided. As regards electric night storage heating, the Tribunal stated "Night storage heaters run off cheap electricity in the night are a perfectly acceptable method of heating residential property".

However, there have been cases where the RPT have upheld a requirement for gas central heating as opposed to electric night storage heating: **LON/00AG/HIN/2009/0004** and **MAN/32UC/HIN/2008/0022** are useful references.

Where electric night storage heating is provided, consideration could be given to the provision of an additional heating source in, say, the main living room to address the problem with loss of heat output during the evenings that is often typical with, certainly, older night storage heating. This could be an on-peak convector/panel heater. However, **CHI/00HA/HIN/2008/0007** needs to be considered. This states the following:

"The Tribunal reviewed the work required for the heating requirements. They noted the wording of the amended Schedule of works under item 2 in the category 1 hazard of Excess cold. This read "Install electric night storage heaters with off peak electricity in each bed-sit and in the common areas. In addition, provide modern panel type heaters with timers and thermostatic controls to each bed-sit." The Tribunal has underlined the words "In addition" and wonders

whether this is rather excessive as a mandatory requirement of work.

As regards heating in general terms, in **CHI/23UF/HPO/2009/0002** the panel considered that it was incorrect to discount the portable electrical heaters that were provided even though the Operating Guidance was unclear on this point.

BIR/31UJ/HIN/2009/0001 is an important RPT case in that it determined that in order to satisfy the requirements of the Operating Guidance, there should be a fixed heating system that heats all the rooms in the house and which could be programmed by and controlled by the occupant. It found that individual room heaters would not be enough to satisfy the requirement. This case also indicates that a minimum "safe" room temperature when the external temperature is –10C was viewed as being 190C rather than the often used 210C.

"Shared heating systems" - **LON/00AF/HIN/2010/0038** was a case where the boiler supplying heating to one flat was located within another one and, thus, was not under the direct control of the occupier and could be tampered with by A N Other. The hearing was adjourned and the parties found and agreed a way forward to deal with the Excess Cold hazard but the outcome was that a separate, controllable, system was required for a dwelling.

A warning: Never take the word of a complainant about whether or not heating is working etc if formal action is being taken. In **LON/00BK/HIN/2010/0012** the tribunal were not satisfied that there was evidence of a category 1 Excess Cold hazard as the local authority, whilst referencing problems with the central heating system and lack of loft insulation, hadn't carried out any tests on the heating system (relied on what they had been told by the occupier) and hadn't actually inspected the loft space.

Running Costs & Efficiency

LON/00BB/HIN/2010/0001 looked at efficiency of a boiler but only within the context of it's age, scaling, permanently lit pilot light and heavy cast-iron heat exchanger rather than, specifically, the running costs.

LON/00AP/HIN/2010/0005 commented that "When considering the nature of the works required affordability was a factor which the

Tribunal could take into account both from the tenant's and the landlords' point of view."

MAN/00BY/HPO/2010/004 commented that "Whilst it is a laudable objective, nowhere is there any requirement in paragraphs 2.19 to 2.23 of the Guidance headed "Preventative Measures and the Ideal", that any space heating system should be affordable. There is a requirement that it is efficient." Whilst any RPT decision does not create precedent, it does create a "persuasive argument" that local authorities should have regard to. This decision makes a clear statement about affordability and a differentiation between efficiency and affordability.

There has been an Upper Tribunal case (previously known as the Land Tribunal) that has involved a dwelling heated by electric, on-demand, heaters of adequate size for the respective rooms sizes, with unknown insulation to sloping ceilings and partial double-glazing. The original RPT reference is **CHI/00HB/HIN/2009/002**0 and the Upper Tribunal reference is HA/5/2010. Ultimately, the Upper Tribunal decision did not, specifically, make a statement as to whether or not it was appropriate to have regard to the relative running costs in determining the hazard assessment but during the course of the hearing a comment along the following lines was made by the QC hearing the case: that whilst a particularly expensive to run heating system could be something that could be considered, the heating provided in this dwelling wasn't such.

At the current time, the advice is that likely running costs are not something that can be taken into account in determining the severity of risk, as represented by the HHSRS score. They may, however, be something to consider in light of the actual occupancy and the determination of the most appropriate enforcement action e.g. whether or not the occupants are in fuel poverty could be the basis of an argument.

The Occupants Wishes etc

HA/5/2010 creates precedent in that it is an Upper Tribunal case. In this respect, the following are considered to be important matters and re-enforce guidance previously given.

"The fact that the occupiers were happy with the (heating) system would not on its own be sufficient reason to conclude that there was no category 1 hazard in respect of excess cold, but it is undoubtedly, in my view, part of the factual matrix to which the RPT could properly have regard. As for determining the appropriate course of action to take in respect of the hazard, the views of the occupiers are manifestly material in my judgement."

"The needs and preferences of the actual occupiers, as well as those of the vulnerable group considered for the purpose of the assessment, are in my judgement material to the choice of the enforcement action to be taken."

Action to be taken:

Consider all the above when assessing the adequacy of heating provided and using this to help produce a hazard score for excess cold. There have been a substantial number of RPT cases that have now looked at Excess Cold and whilst there is a disparity between some of them, they should be considered. A summary of main points has been provided in a document produced by the West of England Local Authorities HHSRS Group (available on the procedure manual) although officers are recommended to read the full decisions. These can be found through - http://www.residential-property.judiciary.gov.uk/search/decision_search.jsp

Consider the actual circumstances of the current, and likely future, occupancy so that, in terms of determining the most appropriate enforcement action to take (and any specific requirements under that action), a justifiable decision can be made. Regard can be had to the decisions of the RPT and it should be remembered that having regard to the actual occupancy is a critical matter in arriving at the selection of the most appropriate action to take in respect to category 1 and 2 hazards.

One of the key outcomes of many RPT and Upper Tribunal cases has been about **proportionality** in terms of a HHSRS assessment, the type of action taken and the remedial action required. The following cases, whilst not specifically related to excess cold, are useful in illustrating how this has been viewed:

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MAN/32UB/HPO/2006/0004

CHI/29UL/HIN/2009/0008

BIR/41UB/HPO/2008/0001

There may well be cases where despite a dwelling not being occupied by a member of the vulnerable group for excess cold (persons 65 years and over), it might be considered that due to the health condition(s) of the actual occupants that some improvement in conditions is still necessary. In such situations officers are expected to obtain proof of such a condition(s) so that any action taken, whether informal or formal, is based upon sound evidence. Examples of suitable evidence will include a GP or consultant letter, copy of a prescription slip and subsequent officer verification that medication is appropriate to the reported condition (e.g. by internet search) etc.

The section 8 statement remains important for all decisions and just as important as the assessment of the hazard score itself. Each case really must be judged on it's own merits.

It is understood that the CIEH is proposing to issue some guidance on the Excess Cold hazard. Whilst this will not have any statutory basis it should provide a further basis upon which action could be referenced. There have been a couple of RPT cases where the tribunal appears to have taken some regard of the, similarly, non-statutory LACORS "Housing – Fire Safety" guidance.

Any adverse impact on customer identified?	**Yes**
(If yes, please give details below)	
If enforcement action is or is not taken based upon the vulnerable group for this hazard, those not of such an age may be disadvantaged through, say, a lesser heating provision. In addition, social exclusion may be an inadvertent outcome.	

Action to eliminate/reduce impact: The determination of the appropriate enforcement action will need to be carefully considered for each case on it's own merits in accordance with the HHSRS Enforcement Guidance. Such guidance is something that officers must have regard to such that what might be regarded as an adverse impact might be unavoidable if a balanced and reasonable approach following the guidance is taken in relation to a particular dwelling.

With regards to the issue of action leading to social exclusion, officers should consider how likely it is that a particular age group etc will use a residential premises. The letting history and on-going proposals of the owner will be important as well as the type of premises', it's height above ground, the external access arrangements and other relevant matters. Suspending the requirements of an Improvement Notice until someone of the vulnerable group is present in a dwelling that is unlikely to be attractive to someone of that age group should not be considered to be a cause of social exclusion.

Officers should also be clear that the HHSRS is an assessment of the severity of the risk of harm that would/should require treatment. It is not an assessment of a degree of discomfort and the Operating Guidance is clear in paragraphs 2.02 and 2.08 about who the "at risk" age group is. The enforcement guidance also clearly states, **"Authorities should bear in mind that any action taken under the HHSRS must be in relation to a hazard. It will not be in relation, directly, to alleviating fuel poverty or improving energy efficiency, though this may be the outcome."**

In this way, "lower standards" are perfectly acceptable (on health grounds) for persons who have not been found to be at significant risk of actual harm. **Officers must acknowledge the difference between likely harm and likely discomfort in their enforcement work, as there is a distinct difference between the two and imposing requirements that are difficult to justify as being necessary (on health grounds) is not reasonable enforcement in the current regulatory regime.**

Originating Officer: Ian Cole

Date of Issue: December 2007

Amending Officer: Ian Cole

Date of Amendment: May 2011

Appendix 8

Standard clauses for excess cold specifications

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Appendix 8

Full specification clauses

1. Heating

1.1 Provide Full Gas Central Heating (single family dwelling)

Supply and install a whole house gas fired central heating system to the premises to satisfy the design and installation requirements of British Standard 5449: 1990 and in accordance with Part L of the current Building Regulations.
The system shall be capable of maintaining the following internal temperatures when the external temperature is –1˚C:

Living room and dining room	21˚C:
Bathroom	22 ˚C:
Elsewhere	18 ˚C:

Sizing of the boiler and radiators shall be determined using an approved Domestic Central Heating Calculator and approved radiator manufacturer's sizing tables.

Radiators shall be so sited as to ensure even distribution of heat whilst minimising heat loss through walls and windows.

The following controls shall be provided:

- A room thermostat suitably positioned and wired so as to provide boiler interlock
- A programmer
- Thermostatic Radiator Valves on all radiators except on the one in the room containing the room thermostat (usually the hall).

Installation and testing (including for soundness and sizing of the gas carcassing under normal operating conditions) should be carried out in strict accordance with the manufacturer's instructions, the Gas Safety (Installation and Use) Regulations 1994 (as amended) and the relevant British Standards/Codes of Practice applicable to domestic gas installations.

A copy of the Manufacturer's instructions should be left with the occupier and the Benchmark document competed by the installer, a copy of which should be provided to the Council.

Note : Prior to installation of a combination boiler, the water pressure available in the dwelling at peak time should be tested to confirm that it is capable of providing the maximum hot water flow rate specified in the chosen boiler manufacturer's schedule.

Where it is established that there is insufficient water pressure for a combination boiler, a conventional boiler shall be used, coupled with an indirect high performance hot water cylinder. As a guide a combination boiler shall be capable of providing domestic hot water at a draw off rate of at least 9.5 litres per minute at a temperature rise of 35˚C.

Work shall not commence on the installation until the design has been agreed with the Supervising Officer (WCC)

1.2 Provide Full Gas Central Heating (Bedsit type HMO, landlord control, heating only)

Supply and install a whole house gas fired central heating system to the premises to satisfy the design and installation requirements of British Standard 5449: 1990 and in accordance with Part L of the current Building Regulations.

The system shall be capable of maintaining the following internal temperatures when the external temperature is –1˚C:

Bed sitting rooms, communal living/dining room	21˚C
Bathrooms	22˚C
Elsewhere, including common landings/stairs	18˚C:

Sizing of the boiler and radiators shall be determined using an approved Domestic Central Heating Calculator and approved radiator manufacturer's sizing tables.

Radiators shall be so sited as to ensure even distribution of heat whilst minimising heat loss through walls and windows.

All radiators shall be fitted with thermostatic radiator valves. All controls,

including the programmer and provision of boiler interlock shall be in accordance with a recognised standard for a communal heating system, and be compliant with Part L of the current Building Regulations. The programmer and room thermostat should be accessible to the tenants, if this is not possible, the heating should be programmed to be on all the time except for up to [seven] hours at night.

Installation and testing (including for soundness and sizing of the gas carcassing under normal operating conditions) should be carried out in strict accordance with the manufacturer's instructions, the Gas Safety (installation and Use) Regulations 1994 as amended and the relevant British Standards/Codes of Practice applicable to domestic gas installations. A copy of the Manufacturer's instructions should be left with the occupier and the Benchmark document competed by the installer, a copy of which should be provided to the Council

1.3 Provide Full Electric Heating – single family dwelling (Storage heaters, off peak dual immersion)

Design and install a full electric heating system for the dwelling using off peak storage heaters. The system shall be capable of maintaining the following internal temperatures when the external temperature is –1˚C:

Living room	21
Bathroom	22
Elsewhere	18

The system shall include the following:

The living room shall be provided with a fan assisted combination storage heater with thermostatically controlled top up convector heater.

The main bedroom, kitchen, hallway, and any other bedroom with a design heat-loss of 600w or over shall be provided with storage heaters. Small bedrooms where storage heating is deemed inappropriate shall be provided with wall mounted electric panel heaters with timers and electronic thermostats. In addition a wall mounted electric panel heaters with timers and electronic thermostats are to be provided in the main living room (and kitchen/diner) in addition to storage heaters.

Bathrooms where practicable shall be provided with storage heaters or otherwise with on peak down flow heaters.

All storage heaters shall have automatic charge control and a thermostatically controlled damper outlet.

For sizing and positioning of storage heaters regard shall be had to the method set out in DOM 8: Guide to the Design of Electric Space Heating Systems, The Electrical Heating and Ventilation Association, 2006. In particular the system shall be designed so that 90% of the annual heat requirement is available at the off peak rate.

All works to comply with the latest edition of the IEE Regulations and Part P of the current Building Regulations.

1.4 Provide Full Electric Heating – Bedsit HMO (Storage heaters, heating only)

Design and install a full electric heating system for the whole building using off peak storage heaters. The system shall be capable of maintaining the following internal temperatures when the external temperature is –1˚C:

Bed sitting rooms	21
Bathroom	22
Elsewhere, including Common landings	18

The system shall include the following:

All bed sitting rooms shall be provided with a fan assisted combination storage heater with thermostatically controlled top up convector heater. All bed sitting rooms, except those between 8 and 11 m^2 in area with one external wall, standard ceiling height, and with another heated space above and below, shall be provided with wall mounted electric panel heaters with timers and electronic thermostats.

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Kitchens of sufficient size and bathrooms where practicable shall be provided with storage heaters or with on peak down flow heaters otherwise.

All storage heaters shall have automatic charge control and a thermostatically controlled damper outlet.

For sizing and positioning of storage heaters regard shall be had to the method set out in DOM 8: Guide to the Design of Electric Space Heating Systems, The Electrical Heating and Ventilation Association, 2006. In particular the system shall be designed so that 90% of the annual heat requirement is available at the off peak rate.

All works to comply with the latest edition of the IEE Regulations and Part P of the current Building Regulations

1.5 Boiler replacement – Combination (heating and instant hot water)

Take out existing combination boiler and remove from site. Install a new combination boiler of sufficient output for the dwelling whose SEDBUK rating complies with the current Building Regulations. In particular the system shall be capable of maintaining the following internal temperatures when the external temperature is –1˚C:

Living room	21
Bathroom	22
Elsewhere	18

Prior to installation the existing radiators and pipe work shall be power-flushed using an approved method.

A copy of the Manufacturer's instructions should be left with the occupier and the Benchmark document competed by the installer, a copy of which should be provided to the Council.

It is recommended that controls are upgraded as necessary to provide a room thermostat (with boiler interlock), programmer, and TRVs on all radiators except the one in the room containing the room thermostat.

1.6 Boiler Replacement – Conventional (Heating and stored hot water)

Take out existing gas boiler and remove from site. Install a new conventional gas boiler of sufficient output for the dwelling whose SEDBUK rating complies with the current Building Regulations. In particular the system shall be capable of maintaining the following internal temperatures when the external temperature is –1˚C:

Living room	21
Bathroom	22
Elsewhere	18

Prior to installation the existing radiators and pipe work shall be power-flushed using an approved method.

Allow for upgrading to a fully pumped system as necessary.

All primary pipework (between the boiler and the hot water cylinder) shall be insulated

A copy of the Manufacturer's instructions should be left with the occupier and the Benchmark document competed by the installer, a copy of which should be provided to the Council.

It is recommended that controls are upgraded as necessary to provide a room thermostat (with boiler interlock), programmer, and TRVs on all radiators except the one in the room containing the room thermostat.

1.7 Boiler replacement – combination for conventional

Prior to installation the contractor will test the water pressure available in the dwelling at peak time to confirm that the water pressure is capable of providing the maximum hot water flow rate specified in the chosen boiler manufacturer's schedule.

Install a new combination boiler of sufficient output for the dwelling whose SEDBUK rating complies with the current Building Regulations. In particular the system shall be capable of maintaining the following internal temperatures when

the external temperature is –1˚C:

Living room	21
Bathroom	22
Elsewhere	18

Prior to installation the existing radiators and pipe work shall be power-flushed using an approved method.

Allow for adaptation of hot water system to mains water supply.

A copy of the Manufacturer's instructions should be left with the occupier and the Benchmark document competed by the installer, a copy of which should be provided to the Council.

It is recommended that controls are upgraded as necessary to provide a room thermostat (with boiler interlock), programmer, and TRVs on all radiators except the one in the room containing the room thermostat.

1.8 Boiler test/service and repair

Investigate the condition of the boiler. Provide an inspection report (with a copy to this office) and carry out all works required to leave in proper working order. All works to be carried out by a Gas Safe registered Contractor in accordance with the current Gas Safety (Installation and Use) Regulations.

1.9 Replace existing radiator(s)

Drain down the system. Take out (defective – specify) radiator in the ….room and replace with double panel/double convector radiator of sufficient output for the room, having regard to room volume and heat loss characteristics of the structure, using an approved Domestic Central Heating Calculator and Approved Radiator Manufacturer's sizing tables. Design temperatures set out in BS5449 should be used i.e. 21˚C in the Living room, 18 ˚C elsewhere and 22 ˚C in the bathroom with an outside temperature of –1 ˚C. Copies of the calculations to be provided to the Supervising Officer prior to start on site.

All radiators to be fitted with thermostatic radiator valves.

Refill system and treat with proprietary anti corrosion agent.

1.10 Provide full set of controls (Room stat with boiler interlock, programmer, TRVs)

Provide a full set of controls to the existing gas central heating system, to include a room thermostat with boiler interlock, programmer (with independent control of heating and hot water if a conventional boiler), and TRVs on all radiators except the one in the room containing the room thermostat.

1.11 Replace Panel Heater

Take out existing (defective – specify) convector/panel heater in the …bedroom. Replace with new adequately sized fixed panel heater with timer and electronic thermostat.

2. Insulation

Walls

2.1 Dry lining (solid walls)

Supply and fit to the external wall a proprietary thermal check/vapour check dry insulated lining system strictly in accordance with the manufacturer's instructions. The thickness of the insulation shall be such as to comply with the requirements set out in Building Regulations - Approved Document L1B (Existing Buildings) for Renovation of Thermal Elements.

Special care must be taken during the fixing process to minimise piercing of the vapour check; the insulation shall be continuous at edges, corners and salient features such as beams, columns and window heads/reveals so as to reduce local paths of high heat loss.

2.2 Dry lining (ring beam construction/ cold bridge)

Provide a band of composite thermal board with vapour barrier, minimum width of 500mm and insulation thickness of 50mm, to the perimeter of the soffit of the concrete ceiling slab where it abutts the external wall. Regard shall be had to Part L of the current Building Regulations, and appropriate documents referred to

Appendix 8

therein, and to Guidance contained in Energy Efficiency Best Practice Guide 188: 'Minimising Thermal Bridging when Upgrading Existing Housing'.

2.3 Cavity Wall Insulation

Provide cavity wall insulation to the right and rear back addition walls using a proprietary method, in accordance with relevant British Standards/Agreement Certificate as appropriate (urea-formaldehyde foamed insulant should not be used). The resultant U value of the walls shall be as close as is practical to 0.35w/m²°C.

Prior to installation an assessment of the wall for suitability for cavity fill shall be carried out in accordance with BS8208 and best practice guides from the Cavity Insulation Guarantee Agency (CIGA)

Carry out repairs as necessary to external leaf of the wall, including cracks, spalled masonry, defective mortar joints and pointing to leave in good condition to receive cavity fill. The cause of any moisture ingress should be identified and remedied.

Holes in the inner leaf and open cavities at wall heads should be sealed.

Services, ventilation ducts and flues should be sleeved through both leaves of the wall and precautions taken to isolate polystyrene and polyurethane insulation from hot flues.

On completion copies of relevant certification shall be provided to the Supervising Officer of the Council.

Roofs

2.4 Insulation to pitched roof (between ceiling joists)

It is recommended that all roof timbers are checked for damp, rot or infestation and remedied as necessary.

Supply and fit proprietary quilted or loose-fill insulation material to BS 5803. The insulation shall be applied between and across the top of the ceiling joists. The depth of insulation to comply with the Building Regulations (275mm in 2010).

Electrical cables shall be kept above the insulation top avoid overheating.

Ensure that adequate ventilation (including cross ventilation) is provided to the roof space, the amount determined by the angle of the roof pitch.

Where loft insulation is installed any cold water storage tanks in the loft shall be fitted with a lid and sides and top insulated omitting insulation to the underside of the cistern. Insulate gap below the cistern base by turning up the loft insulation. Include the rising main within the insulated enclosure of the tank.

Insulate all cold water pipes to the loft including overflows with materials conforming to BS5803 and BS5422. Regard shall be had to BS5803 and BS6700 regarding installation of pipe insulation which shall be continuous over all pipes and fittings including junctions.

2.5 Insulation to pitched roof (between rafters – eg loft floor boarded)

Supply and fit proprietary quilted insulation material in the main roof between and below the rafters. The depth of insulation to comply with the Building Regulations (275mm in 2010).

Install purpose made eaves vents that provide the equivalent of a 25mm continuous ventilation gap, as well as ventilation at the ridge in order to maintain cross ventilation of the roof space and prevent condensation.

Provide a vapour control layer of 500 gauge polyethylene on the warm side of the insulation to prevent moist air passing through.

2.6 Provide loft hatch

Provide loft hatch to [back addition] roof. Form an opening in the ceiling, trim joists, line the opening, fix architraves and fit

suitable access cover. The loft hatch shall incorporate draft stripping and fixed insulation.

2.7 Insulation to flat roof (concrete deck, covering satisfactory, inverted roofing boards)

Supply and fit a proprietary high density mineral wool (or equivalent) inverted roofing board system to existing waterproof membrane strictly in accordance with manufacturer's instructions. Thickness of board to comply with the maximum U-value in the current Building Regulations. Allow for increasing height of upstands as necessary. Allow for preparation of roof surface to accept boards in accordance with manufacturer's instructions and to ensure adequate drainage.

Proper notice of this work shall be given to the Council's Building Control Officer and a full assessment of the existing roof shall be undertaken by a competent person, including any structural and wind loading calculations recommended by the manufacturer, prior to start on site.

2.8 Flat Roof (Concrete deck, covering satisfactory/can be repaired/needs replacing – PREFERED OPTION)

Provide thermal insulation to the ….roof to to comply with the maximum U-value in the current Building Regulations, using a proprietary method strictly in accordance with the manufacturer's instructions. Required thickness of insulation to achieve the above value to be confirmed with the manufacturer:

Repair/prepare as necessary existing waterproof layer to receive thermal insulation and act as the new vapour barrier*

Strip off existing defective waterproof layer complete, provide new vapour barrier to receive insulation layer*

(*delete as necessary)

Bond insulation material to vapour control layer using only method specified by the manufacturer.

Allow for increasing height of upstands as necessary

Provide a new waterproof membrane (with solar reflective finish) over the insulation and leave whole sound and watertight

2.9 Flat Roof (Wooden deck, insulation from above)

Provide thermal insulation to the ….roof to comply with the maximum U-value in the current Building Regulations, using a proprietary method strictly in accordance with the manufacturer's instructions. Required thickness of insulation to achieve the above value to be confirmed with the manufacturer:

Repair/prepare as necessary existing waterproof layer to receive thermal insulation and act as the new vapour barrier *

Strip off existing defective waterproof layer, replace any timber decking or roof joists found to be rotten or otherwise defective, provide new vapour barrier to receive insulation layer.The vapour barrier is to be a high-performance vapour control layer bonded or mechanically fixed to the deck with joints sealed in hot bitumen.*

(*delete as necessary)

Bond insulation material to vapour control layer using only method specified by the manufacturer.

Allow for increasing height of upstands as necessary

Provide a new waterproof membrane and ensure a solar reflective finish such as white chippings or solar reflective paint to prevent solar deterioration and leave whole sound and watertight.

Adequate ventilation should also be included in the schedule of remedial works.

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2.10 Flat Roof (Wooden deck, insulation between/below joists)

Provide thermal insulation between and below joists of the roof to comply with the maximum U-value in the current Building Regulations, using a proprietary method strictly in accordance with the manufacturer's instructions. Required thickness of insulation to achieve the above value to be confirmed with the manufacturer:

Take down existing ceiling complete. Fix proprietary insulation between joists, and a thinner layer below the joists to prevent cold bridging, using fixings supplied by manufacturer. Leave a 50mm air gap between the top of the insulation and the timber roof deck and provide ventilation to this space.

Provide a new plaster board ceiling incorporating a vapour barrier.

Floors

2.11 Insulation to ground floor (suspended timber, with access from below)

Provide mineral wool insulation supported by netting between the joists between the floor joists strictly in accordance with the manufacturer's instructions to to comply with the maximum U-value in the current Building Regulations.

Fill any gaps between floorboards and skirting boards with sealant (care must be taken not to block under floor air vents).

3. VENTILATION

Windows and doors

3.1 Provide double glazed window(s)/door(s)

Take out existing windows in rooms and cart away. Supply and fit new double glazed windows of similar design in these rooms, to have maximum whole unit U-value of 2.0 W/m2˚C or centre pane U-value of 1.2 W/m2˚C to comply with the current Building Regulations Part L.

3.2 Provide Secondary Glazing

A proprietary secondary glazing system set in an aluminium or plastic frame shall be provided to windows and installed in accordance with the manufacturer's instructions.

The air gap between the existing and secondary glazing shall be a minimum of 20mm. Secondary glazing shall be draught stripped while the existing windows shall be left without seals.

The selected system should be easily openable for rapid ventilation and be capable of being left slightly open to allow trickle ventilation into the room

3.3 Draught Proofing - general

Proprietary draughtstrips shall be fitted to windows/ external doors to room(s). Products used should comply with BS 7386: 1997 and installation shall be in accordance with BS Code of Practice 7880: 1997 and manufacturer's instructions:

3.4 Draught Proofing External Doors

Suitable draughtstrips for the top and sides shall be in good quality rubber (EPDM, silicone), sheathed foam or nylon brush, with rigid PVC-U or aluminium carriers nailed or screwed to the door frame. Seals fitted within the gap between the door and frame shall have a range of 6mm with a compression allowance of 3mm.

A letter box draught cover and aluminium threshold seal incorporating flexible draught and weather strips also to be provided.

3.5 Draught Proofing Wooden Windows

Where applicable draught strips shall be angled blade seals or rubber tube fixed to carriers for casement windows and brush pile bonded to carriers for sliding sash windows. Self adhesive options should be avoided where possible. Ensure that the strips are suitably sized for the gaps to be covered.

3.6 Draughtproofing Steel Frame Windows

Specialist draughtstrips may be needed for these windows as they often have very small gaps, especially on the hinge side. These include tube and 'V' seals, fixed face seals, and clip on seals where a carrier is fitted into position over the thin steel section of the frame

Mechanical ventilation

3.7 Provide bathroom/kitchen extract fan (anti condensation measure)

In the bathroom/kitchen a dual speed extract fan should be fitted, ducted to external air and terminating in a louvred wall cowl. It shall have a continuous background mode and boost mode controlled by a humidistat set to operate the fan when the relative humidity reaches 65 % at a temperature of 20˚C. Particular regard shall be had to the maximum recommend duct lengths, number of 90˚ bends, and siting of the roof/wall cowl to ensure optimal performance of the hood. The appliance shall comply with Part F of the current Building Regulations 2000.

3.8 Provide Cooker Hood (Anti condensation measure)

In the kitchen a proprietary cooker extraction hood ducted to the external air, terminating in a louvred wall cowl. Particular regard shall be had to the maximum recommended duct lengths, number of 90˚ bends, and siting of the wall cowl to ensure optimal performance of the hood. The appliance shall be capable of an extraction rate of at least 30 litres per second.