



FIRE & CO SAFETY IN HOUSING

Essential guidance for:

- RSLs and other landlords
- Housebuilders and developers
- Architects and Surveyors
- Building Control Officers
- Electrical Contractors

from the world leaders manufacturing over 35 million
smoke, heat and carbon monoxide alarms every year

**2013
EDITION**



Smoke & Heat Alarms

Code of Practice

Introduction

This guide aims to help all housing providers, specifiers and installers to understand fully their responsibilities for protection of occupants from death and injury resulting from fire or carbon monoxide (CO) poisoning. Although CO is primarily associated with incomplete combustion, many people have died from CO poisoning during fire incidents. While subject to separate Standards and Regulations – discussed in the first sections of this guide – there are compelling reasons for specifiers and housing providers to consider both fire and carbon monoxide risks together, as discussed later.

In both areas, there are complex and changing local requirements and guidelines to consider. However, there is a compelling case for universal minimum recommendations for hard-wired smoke, heat and carbon monoxide alarms to ensure that all requirements are satisfied and responsibilities being met: these recommendations are summarised at the end of this document. Hard-wired alarms should always be installed by qualified electrical contractors (where necessary certified to Building Regulations Part P in England and Wales).



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BS 5839 Part 6:2013

British Standards take the form of guidance and recommendations, and are not in themselves mandatory – although they may form the basis of Building Regulations, be referred to in specifications and used as a benchmark in many situations including legal proceedings and the Housing Health and Safety Rating System (HHSRS).

BS 5839:2013, Fire detection and fire alarm systems for buildings – Part 6: Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises is the current Code of Practice, recognised as the authoritative guidance for all housing. It covers both new and existing dwellings whether for single families or houses in multiple occupation (HMOs) consisting of self-contained units. This latest edition also includes sheltered housing.

While BS 5839 Part 6 is based on a risk assessment approach for each situation, it recognises that in most cases guidance given in the code can be applied as a minimum standard. However, if there are risk factors additional to those encountered in typical examples, a specific risk assessment may be called for. Although principally concerned with systems for the protection of life (Category LD, covering 'Life' and 'Dwellings'), it also offers guidance on property protection (Category PD).

Minimum Levels of Protection

BS 5839 Part 6 tabulates the minimum Categories and Grades recommended for different types of housing, summarised opposite. This is considered appropriate for groups of dwellings with varied occupant characteristics or new-build where occupants are unknown. It is also used for individual, occupied homes, but may be modified to a higher standard resulting from a risk assessment. Also, if the risk to occupants is high (e.g. if they suffer from any mental

or physical disability) LD1 or LD2 is always appropriate. If there is any doubt about the appropriate system, specialist advice should be sought and a risk assessment carried out.

Grades of System

Essentially, Grade addresses the reliability of a system in terms of its power sources.

- Grades A-C more complex systems outside the scope of this guide
- Grade D interlinked mains smoke/heat alarms with back-up power
- Grade E interlinked mains smoke/heat alarms, no back-up power
- Grade F interlinked battery powered smoke/heat alarms

Normally alarms should be interconnected, and can be radio-linked or interlinked by wiring. Grade D is now the norm for the majority of domestic situations. Grade F may only be considered for some existing, owner-occupied dwellings but not unless there is a 'reasonable certainty' that batteries will be replaced when necessary: sealed-in battery types can resolve this issue. Grade E is inappropriate where there are likely to be periodic interruptions to mains power (for example, for non-payment or with coin-operated meters).

Categories of System

Category defines in which areas detectors (i.e. smoke/heat alarms) are required. It does not address the issue of audibility of the alarm sounders for occupants (discussed later).

- Category LD1 throughout the dwelling including all escape route circulation areas and any areas where fires might start, including roof voids (but not sanitary accommodation)
- Category LD2 all escape route circulation areas and any areas where fires might start (such as Kitchens and Living Rooms)
- Category LD3 all escape route circulation areas

Clearly, LD1 is the ideal, although a good level of protection can generally be obtained from LD2, which is now considered the norm for the majority of domestic situations. The Code stresses that with LD3 the evacuation time once fire is detected in the circulation area might be quite short and also **'might not prevent death or serious injury of occupants of the room where fire originates'**.

Minimum for most situations

Grade:	D (mains with back-up)
Category:	LD2 as follows:
Hall (ground floor)	Optical
Landings	Optical
Kitchen	Heat
Living Room(s)	Ion/Heat

The minimum standard is shown above for most situations covering:

- new or materially altered homes (such as loft conversions) or
- existing where structural fire precautions might not comply (see below)
- with up to three storeys
- and no single floor over 200m².

The above also applies to:

- one/two storey HMOs with no single floor over 200m²
- individual dwelling units in larger HMOs
- single storey dwellings over 200m².

The standby power supply for Grade D smoke alarms in rented flats with access above ground floor level should be tamper-proof, e.g. cells soldered to a printed circuit board, or batteries that are fixed in place and cannot readily be removed. The standby power supply for Grade D smoke alarms in rented two storey premises should be tamper-proof and long-life (i.e. lithium cells).

Other Situations

Higher, Grade A systems (outside the scope of this guide) apply to:

- Four or more storey houses (except existing where structural fire precautions definitely comply – see below – where LD2/D may be appropriate)
- Two or more storey houses with any floor over 200m²
- Communal areas of HMOs and sheltered housing, and NHS supported housing.

There may be financial savings in specifying a lower Category/Grade in some situations and this is recognised by the Code although it does frequently point out that specific circumstances may still justify LD2/D: ultimately, the responsibility for deciding on a lower standard lies with the specifier.

Lower, Grade F battery-powered alarms can only be considered in existing, owner-occupied, one or two storey dwellings – and only where there is a ‘reasonable certainty’ that batteries will be replaced when necessary: sealed-in battery types can help resolve this issue. This latest edition of the Code now excludes Grade F for all rented homes.



Lower, Category LD3 systems can only be considered in existing dwellings that meet current Building Regulation guidance on fire safety (such as Approved Document B) – something that is particularly difficult to demonstrate. If there is any doubt about the compliance of any aspect of fire safety precautions, the higher alarm standard should always be adopted (in reality, most cases) – generally LD2/D. Category LD3 is also excluded from all four or more storey houses, and two or more storey houses with any floor over 200m².

Types of Alarm

The Code of Practice reviews various types of detector/alarm unit including the following.

Ionisation Smoke Alarms

Sensitive to small smoke particles from rapidly burning, flaming fires but less so for smouldering fires and smoke that has travelled some distance. Some organisations are already taking on board an EC directive that encourages alternatives to ionisation smoke alarms because of the small amount of radioactive components within them.

Optical (aka Photo) Smoke Alarms

Sensitive to larger particles from smouldering fires and less prone to nuisance alarms than their ionisation equivalents, especially from steam. Nuisance alarms result in disabling and could lead to death/serious injury.

Heat Alarms

Respond more slowly to fires than smoke alarms but are less likely to give false alarms and require less maintenance. They must always be interlinked with smoke alarms.

Carbon Monoxide Fire Detectors

Outside the scope of this document and not to be confused with carbon monoxide alarms (discussed later).

Selection and Location

The Code recommends which types of detector/alarm unit are most suited to specific areas, based on their performance characteristics:

- Circulation Spaces (Halls and Landings) – Optical Smoke Alarms
- Kitchens – Heat Alarms
- Principal Living Room(s) – Heat Alarms or Ionisation Smoke Alarms
- Bedrooms – Optical Smoke Alarms.

Smoke and heat alarms should preferably be ceiling-mounted at least 300mm (horizontally) from walls or light fittings. For LD3 systems, no point within the circulation area should exceed 7.5m from the nearest alarm. There should also be a smoke alarm between each bedroom and every other room (except sanitary accommodation).

Audibility

The Code discusses audibility of alarms in detail, particularly in bedrooms with closed doors. Alarms in circulation space must be within 3m of all bedroom doors and generate 85dB(A) at the doorway. Part 1 of the same standard recommends a sound level of 75dB at the bedhead but Part 6 recognises that doors attenuate sound by at least 20dB, so this cannot be achieved without an alarm/sounder within the bedroom. However, the Code dismisses the need for an alarm/sounder in bedrooms, justified by an apparent lack of evidence that lives are being lost. This misplaced approach is discussed later. Interestingly, the new edition of the Code does recommend an interconnected alarm or sounder in the main bedroom of sheltered housing units.

Other Requirements

All specifications, statutory requirements by enforcing authorities, instructions and the relevant system certificate from the installer should clearly state:

- The Grade of System
- The Category of System
- For Category LD2, the rooms in which alarms should be located.

Building Regulations

Generally, compliance with Building Regulations is mandatory for all new building work, extensions, loft conversions, changes of use and some other alterations. To assist with compliance, Approved Documents, Technical Handbooks and other guidance documents are published (although other means of complying can be adopted). The most recent editions of these documents are referred to in the guidance that follows.

In the case of fire safety, Building Regulation guidelines refer to the BS 5839 Part 6 Code of Practice, although differ from it in some cases. Generally, they are consistent in requiring a system of interconnected (radio or wired), mains alarms with back-up. Differences appear with the number, type and locations of alarms. There is also a temptation for housing providers to use Building Regulations as a benchmark for protecting existing housing. This is a dangerous mistake with fire detection: as the Code shows, a higher standard may be justified in existing homes to take into account the lower level of structural fire protection (doors, partitions, floors and so on).

England and Wales Part B



The current Approved Document B: 2000 (2006 edition) falls well below the minimum standard for new housing in the Code of Practice, although it refers to that document. It requires only Category LD3 protection and heat alarms in some (not all) kitchens – the room where most fires start. The Code considers that LD3 'might not prevent the death or serious injury of occupants in the room where the fire originates'. England and Wales are currently alone in failing to match the Code and responsible housing providers routinely exceed Part B requirements.

Minimum Levels of Protection

Other than larger houses (with any storey exceeding 200m² requiring Grade A or B systems, outside the scope of this document), requirements are as follows:

Grade:	D (mains with back-up)
Category:	LD3 as follows:
Hall (ground floor)	Optical
Landings	Optical
Kitchen (if un-separated from circulation areas)	Heat

Future Developments

With the proposed devolvement of Building Regulations in Wales to the Welsh Assembly Government (WAG), Part B will no longer apply there. At the time of publication (June 2013), it is not known what provisions will be made in WAG Regulations. However, WAG has passed legislation requiring fire suppression systems in all new housing in Wales. Mandatory residential sprinklers are essentially unrealistic in terms of both cost and practicality, and miss an obvious opportunity to save lives at a much lower cost with more hard-wired smoke and heat alarms in line with the Code. For England, no further changes to Part B were proposed during a 2011 review.

Scotland 2013 Building Standards



The 2013 Building Standards Domestic Technical Handbook follows the 2011 version and requires at least one additional hard-wired smoke alarm in every principal habitable room - in other words, frequently used rooms for general daytime living purposes - and at least one heat alarm in every kitchen, in addition to the previously required alarms in circulation routes. Inner rooms and adjoining access rooms also need smoke/heat alarms. Unlike previous editions, these requirements now meet Category LD2 of the Code, although there are detailed differences.

Grade:	D (mains with back-up)
Category:	LD2 as follows:
Hall (ground floor)	Optical*
Landings	Ion*
Kitchen	Heat
Living Room	Optical*

*see the Technical Handbook for further clarification of alarm types and positions, which differ from the Code.

All alarms must be interlinked.

Northern Ireland Part E



The current Technical Booklet E: 2012 refers to and mirrors the Code of Practice and compliance with the Code will meet the requirements.

Minimum Levels of Protection

Other than houses or flats with any storey exceeding 200m² (which require Grades A or B systems, outside the scope of this document), requirements are as follows:

Grade:	D (mains with back-up)
Category:	LD2 as follows:
Hall (ground floor)	Optical
Landings	Optical
Kitchen	Heat
Living Room	Ion

All alarms must be interlinked.

Republic of Ireland Part B



Technical Guidance Document B, Fire Safety refers extensively to the Code of Practice and compliance with the Code will meet the requirements. System Grade D is the minimum standard, as Grades E and F (mains only or battery powered) are not acceptable for new homes. The Category (minimum LD2) is determined by the height, size and type of dwelling as summarised below.

Minimum Levels of Protection

Two dwelling types are identified, as follows. Up to 3 storeys above ground level:

Grade:	D (mains with back-up)
Category:	LD2 as follows:
Hall (ground floor)	Optical
Landings	Ion*
Kitchen	Heat
Living Room	Ion

Over 3 storeys above ground level, large houses or higher risk:

Grade:	D (mains with back-up)
Category:	LD1 as follows:
Hall (ground floor)	Optical
Landings	Ion*
Kitchen	Heat
Living Room	Ion
Bedrooms	Optical
All other habitable rooms	Ion

*differs from the Code recommendation
All alarms must be interlinked.



CO Alarms

Regulations & Standard

Building Regulations

The UK and Ireland have lagged behind some other countries with Regulations to address CO poisoning in homes: for example a growing number of American States have demanded CO alarms in all housing for some time. However, requirements for CO alarms began to appear in 2010 for England and Wales, followed in 2012 by Northern Ireland, most recently Scotland and, at the time of publication (August 2013), draft provisions for the Republic of Ireland are expected to be enacted shortly.

The Regulations vary in terms of their approach to different combustion fuels and location of alarms, attempting to reflect the greatest potential risks. There are important parallels here with the gradual change in approach to smoke and heat alarm requirements. Today, they no longer attempt to predict specific sources of fire but aim to cover all situations. Mandatory smoke alarms in all new housing now provide an effective, low-cost means of detecting and warning of fire, irrespective of its source. By its very nature, and as discussed later, carbon monoxide justifies exactly the same approach. Building Regulations should therefore move on to demand CO alarms in every new home, as well as wherever any combustion appliance is fitted in existing dwellings, irrespective of fuel type and not just focus on specific risk areas.

The various Regulations are agreed that CO alarms should be powered either by batteries designed to operate for the whole working life of the alarm or hard-wired mains. Alarms should also have an end-of-life warning.

England and Wales Part J



The current Approved Document J: 2000 (2010 edition) requires installation of a CO alarm in the same room as a new or replacement fixed solid fuel appliance (with a rated output up to 50kW). The alarm can be either mains (but not plug-in) or whole-life battery powered.

Future Developments

With the proposed devolvement of Building Regulations in Wales to the Welsh Assembly Government (WAG), Part J may no longer apply there. At the time of publication (August 2013), it is not known what provisions will be made in WAG Regulations.

Northern Ireland Part L



Technical Booklet L 2012 requires installation of a CO alarm in the same room as a new or replacement combustion appliance not solely for cooking purposes. If the appliance is in a boiler room or other unused space, the alarm should be just outside. The alarm can be either mains (but not plug-in) or whole-life battery powered.

Scotland Technical Handbooks Section 3



Both 2013 Technical Handbooks (taking effect October 2013) require CO alarms in dwellings and non-domestic residential buildings where a new or replacement combustion appliance (not solely for cooking purposes) is installed. In addition, an alarm will be required in any bedroom or principal habitable room where a flue system passes through the room. Alarms can be either mains (but not plug-in) or whole-life battery powered.

Republic of Ireland Part J (proposed)



The 2012 draft Technical Guidance Document J includes proposals for CO alarms to be fitted in rooms where combustion appliances are fitted and also requires a CO alarm in every bedroom or in the corridor within 5m of the bedroom door. In addition, an alarm will be required in any bedroom where a flue system passes within or over the room from any combustion heating appliance. Alarms can be either mains (but not plug-in) or whole-life battery powered.

Other regulations applying to existing homes, discussed later, also require installation of CO alarms.

BS EN 50292:2002

BS EN 50292:2002, Electrical apparatus for the detection of carbon monoxide in domestic premises – Guide on the selection, installation, use and maintenance offers the current guidance on CO alarms for dwellings. It stresses that CO alarms are not a substitute for good installation and regular servicing of fuel burning appliances or cleaning of flues, and that they are not intended to be used as an alternative to a smoke alarm.

Selecting Room Locations

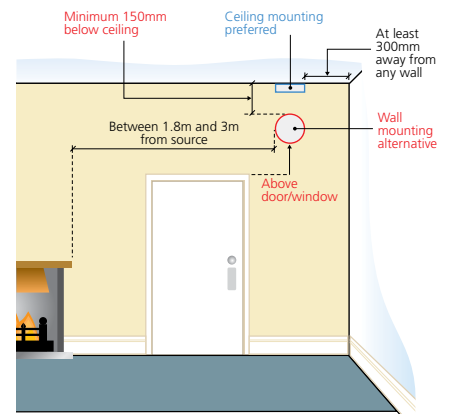
The number and locations of CO alarms will depend upon the dwelling layout. It is essential that:

1. carbon monoxide reaches the alarm from the source to trigger it
2. the alarm sounder must be capable of alerting occupants and waking those who are asleep.

Ideally, a CO alarm should be installed in every room containing a fuel-burning appliance and in other areas to give warning such as well-used remote rooms and all bedrooms. If this is not viable, CO alarms should be considered in any room containing a flueless or open-flued appliance and where the occupants spend most time and/or sleep. As an absolute minimum there should be at least one on each level and preferably in bedrooms.

Selecting Positions within Rooms

Recent research shows that CO is normally emitted warm and so will tend to flow upwards, determining best locations as upper wall level or ceilings. CO alarms in the same room as a fuel-burning appliance should be located close to, but at least 150mm from the ceiling and above any door or window. For ceiling mounting, the unit should be at least 300mm from any wall and Kidde's circular alarms are the natural choice. The unit should also be at a horizontal distance of between 1m and 3m from the potential source. If there is a partition in a room, the unit should be located on the same side of the partition as the potential source. CO alarms in rooms with sloped ceilings should be located at the high side of the room. Units in bedrooms or rooms remote from the fuel-burning appliance should be located relatively close to the breathing zone of the occupants. Positioning should allow viewing of all the light indicators.



Alternative Locations – Rooms with Fuel Burning Appliance



CO Alarms

General Guidance

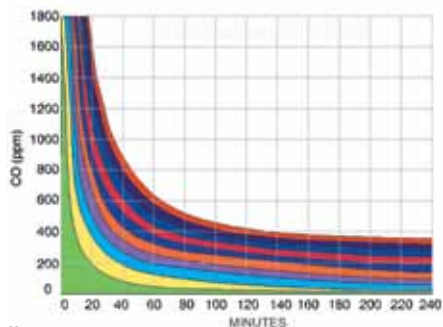
CO alarms should **not** be fitted:

- in an enclosed space (for example in a cupboard or behind a curtain)
- where it can be obstructed (for example by furniture)
- directly above a sink
- next to a door or window
- next to an air vent or extractor fan
- in an area where the temperature may drop below -10 deg C or exceed 40 deg C
- where dirt and dust may block the sensor
- in a damp or humid location
- in the immediate vicinity of the cooking appliance.

Carbon Monoxide Poisoning

According to the Health and Safety Executive, carbon monoxide (CO) poisoning causes an estimated 50 deaths and 200 serious injuries annually in Britain. Other organisations have recorded higher levels and these figures could be the tip of the iceberg, reflecting just what we know about: CO poisoning is certainly under-diagnosed by doctors and often unrecognised by coroners, as it simulates other conditions.

CO is odourless and colourless. It bonds with haemoglobin in the blood to gradually replace essential oxygen, preventing the uptake of oxygen into the blood, resulting in headaches, nausea, unconsciousness – and finally death. While exposure to high concentrations leads to collapse, long-term exposure to lower concentrations can result in symptoms similar to flu or food poisoning. As the chart shows, lower level exposure over a longer period can prove fatal just as higher level, short-term doses. Surviving victims of CO poisoning may well be left permanently unwell and disabled through neurological damage.

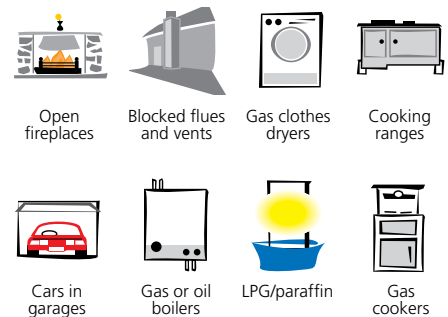


Key	Percentage of COhb	Effect
Red	50%	Death
Dark Blue	45%	Coma/brain damage
Blue	40%	Collapse
Light Blue	35%	Vomiting
Dark Green	30%	Drowsiness
Green	25%	Nausea + headache
Light Green	20%	Headache
Yellow	15%	Mild headache
Orange	10%	None
White	5%	None

Sources of Carbon Monoxide

CO can be produced by any fuel burning appliances resulting from the incomplete combustion of carbon based fuels including bottled or mains gas, coal, oil and wood. Typical appliances include boilers, water heaters and wood burning stoves, as well as extended use of fireplaces and ovens. Recent experience highlights issues with cookers which, as tenant's own appliances, may well not be fully checked. Similarly, oversized pans and interference with burners using foil have also caused problems, as have charcoal and gas grills or hibachis operated in enclosed spaces. Other unfixed appliances introduced by occupiers are also a danger, including LPG and paraffin heaters and clothes dryers.

With fixed appliances, problems often occur from blockages and back-drafts in flues or loose, blocked or inappropriate vent pipes. Indications of problems include slow burning or extinguished solid fuel appliances, sooty stains around the appliance or orange/yellow gas flames instead of blue. Cars running in open or enclosed garages, particularly when integral or attached to the house, also pose a threat.



Hidden Dangers

The main difficulty with CO is that the dangers are often far from obvious and it comes from a surprisingly wide variety of sources – not just gas appliances, which for rented (but not owner-occupied) housing must be checked annually under the Gas Safe regime. So, there are very real dangers in homes both old and new. Shared flues can cause unexpected problems and there have been instances of CO from flues discharging onto common areas affecting neighbouring properties, whether alongside or above the source – sometimes with lethal consequences.

In multi-occupancy (HMO) and multi-storey buildings, carbon monoxide produced in one area may be transported to and leak into another part of the building, e.g. across roof spaces, between floors, along ducting and in shared flues. A wide diversity of

other CO poisoning sources have also been recorded ranging from barbecues operated in confined spaces to fast food shop outlets affecting neighbours. The idea that CO issues are limited to just older buildings, poorer households and student 'digs' is entirely false. As the UK government's Chief Medical Officer has stressed – CO poisoning can occur in any type or age of property, including brand new, owner-occupied housing.

Other Influences and Sustainability Measures

Other factors can also have a serious impact on CO within buildings, including wind direction and velocity (particularly gusts), temperature inversion (where exhaust gases can be trapped near the ground), negative pressure from exhaust fans and simultaneous operation of several appliances (which then compete for internal air for combustion).

Today, risks are increased by installation of double-glazing and the sealing up of buildings for energy conservation, so reducing scope for air intake. Other sustainability measures can also pose surprising risks, such as the lethal build-up of CO in wood pellet storage for bio-fuel heating.

Meeting Responsibilities

We simply cannot predict all the possible sources of CO in a home, the actions of occupants and the impact of changes over time. But installation of CO alarms that provide an audible warning at exposure levels well below those critical to healthy adults not only saves lives but also helps satisfy housing providers' and landlords' responsibilities, and avoid action for damages in today's litigation-conscious society.



Reliability and Quality

Bearing in mind the unknown dangers involved here, it is also essential that CO alarms work effectively throughout their design lives. The Health and Safety Executive recommends that: *'Before purchasing a CO alarm, always ensure it complies with British Standard EN 50291 and carries a British or European approval mark, such as a Kitemark.'*



Existing Housing Requirements

Existing Housing

Requirements for all types of housing

As we have seen, Building Regulations cover extensions, material alterations (including loft conversions) and installation or replacement of controlled fittings (such as heating appliances). Otherwise, it is generally regarded as difficult or undesirable for government to impose further requirements on homeowners, leaving them to decide whether or not to install smoke, heat or CO alarms.

Community Fire Safety initiatives delivered by local Fire and Rescue Services continue to encourage use of smoke alarms and other campaigns highlight the need for CO alarms. Retail purchased alarms are generally battery powered, self-installed types.

Wherever possible, architects, builders, electrical contractors and others involved with individual property refurbishments should encourage installation of hard-wired smoke, heat and CO alarms to protect occupants, as an essential part of the works.

Other requirements do apply to owner-occupied homes. For example, regulations covering installation of inspection hatches for existing flues hidden in wall and ceiling voids, also required gas engineers to check for a CO alarm or fit one.

Also, the government's 'Green Deal' initiative for upgrading the energy performance of existing properties recognises the added risk from carbon monoxide. At the time of publishing, the new Green Deal 'Installer Standard' is being developed and will include a requirement for all installers to assess the impact of their work on air-tightness and any associated increased risks of CO poisoning. If there is any increase, a CO alarm must be installed. Installers must also check any existing CO alarms to ensure they are in full working order.



Rented Housing

Understandably, more stringent requirements apply to rented housing. In Scotland, hard-wired smoke alarms are already a requirement of the Housing (Scotland) Act 2006 in rented housing, with at least one on each floor. At the time of publishing, similar measures are being debated by the UK government and there are pressures for CO alarms to be installed in all rented housing.

Housing quality standards, which rented homes should meet, vary in their specification of fire and CO safety measures but the Housing Health and Safety Rating System provides a useful model.

Housing Health and Safety Rating System

The Housing Health and Safety Rating System (HHSRS) risk assessment procedure is effective in England and Wales, and may apply in Northern Ireland in due course. The underlying principle of the HHSRS is that any residential premises should provide a safe and healthy environment for any potential occupier or visitor. To satisfy this principle, a dwelling should be designed, constructed and maintained with non-hazardous materials and should be free from both unnecessary and avoidable hazards.

The HHSRS Regulations prescribe the manner of inspections and method of assessing hazards. HHSRS also replaces the fitness standard as an element of the Decent Home Standard. Local authorities have a duty to keep housing conditions under review and, if there is reason to think that a hazard exists (for example, complaints from tenants), should use HHSRS to make an assessment and, if necessary, take enforcement measures. HHSRS applies to both public and private sector housing.

Inspectors record 'faults' (the failure of building elements to meet 'ideals' identified in HHSRS – generally meeting current British Standards or Building Regulations), the potential they have to cause harm (i.e. 'hazards'), any remedial action and the likelihood of an occurrence over 12 months which could harm a vulnerable group. There are 29 hazards identified and discussed in detail within HHSRS, and four 'classes of harm' with the highest being Class 1 (death or other extreme harm). Several different faults can contribute to a single hazard. Faults that are not the responsibility of the landlord or owner are excluded (e.g. a tenant's defective mobile gas heater).

Dedicated computer software is used to develop two 'Categories': local authorities must take action with Category 1 hazards while Category 2 hazards are discretionary.

A 'decent home' must not contain a Category 1 hazard. Fire and carbon monoxide poisoning are identified as 2 of the 29 hazards. Properly sited and maintained smoke and CO alarms are HHSRS 'ideals' and a lack of them is cited as one of the 'relevant matters' affecting the likelihood and harm outcome. It is unclear how inspectors will allocate hazard scores and there are real concerns that 'faults' are either not identified or ignored as the tenant's responsibility.

There is therefore a strong case for high scores in the absence of appropriate alarms. Similarly, installation of smoke, heat and CO alarms to British Standards could substantially reduce a hazard (perhaps from Category 1 to 2) at a much lower cost than other remedial measures, so meeting 'Best Value' criteria.

Civil Law Responsibilities

This document explores a variety of different regulatory requirements for housing providers to install smoke, heat and CO alarms. But where government has not spelled out a requirement, legal liability can still apply when alarms are not installed. This is because the civil law imposes a duty on everyone in business (such as all types of landlord), no matter what that business is, to take all reasonable measures to ensure the safety and well-being of all those they know are likely to be affected by their activities (including all tenants). There is no limit on the amount of damages that a court can award if a business fails in its duty of care. Kidde has obtained a legal opinion clarifying responsibilities: for a copy please email: kiddefyr@ukgateway.net

Interpreting Responsibilities

With both HHSRS and legal action under civil law generally, current British Standards will provide the benchmark for interpreting what reasonable steps a landlord should take in protecting tenants. As we have seen, fire Building Regulations are not appropriate for existing buildings and those for CO remain limited. BS 5839 Part 6 now recommends hard-wired smoke/heat alarms in all rented housing. Furthermore, any alarms not hard-wired into the property may well be excluded as 'fixtures' covered by standard tenancy agreements (with requirements not to remove or interfere with them).

Where there is an absence of specific regulations requiring smoke, heat and CO alarms in rented housing, it is in the landlord's interest to install them to protect tenants and execute their duty of care.

Recommendations

Meeting Responsibilities

Housing providers, specifiers and installers have clear responsibilities to fit smoke, heat and carbon monoxide alarms to protect occupants, even if not spelled out in legislation. Where they apply, the minimum requirements to meet those responsibilities can be found in the latest Building Regulations. In other situations, British Standards provide the benchmark and, as they provide the most up-to-date, comprehensive guidance for smoke, heat and CO alarm systems, may be a better choice than lower-standard Building Regulations. So, British Standards form the basis of the recommendations below. In addition, allowance should be made as far as possible for anticipated changes to the building and its usage over time – i.e. future-proofing.

Ensuring Alarm Audibility

However, both Building Regulations and British Standards fail to address the problem of occupants being able to hear triggered alarms, particularly to wake them at night – an issue that Kidde has been lobbying about over the last few years. The drive for better acoustic privacy within housing is leading to better sound reduction from partitions and particularly internal doors and doorsets that can substantially reduce audibility of landing-located alarms at the bedhead where it is needed.

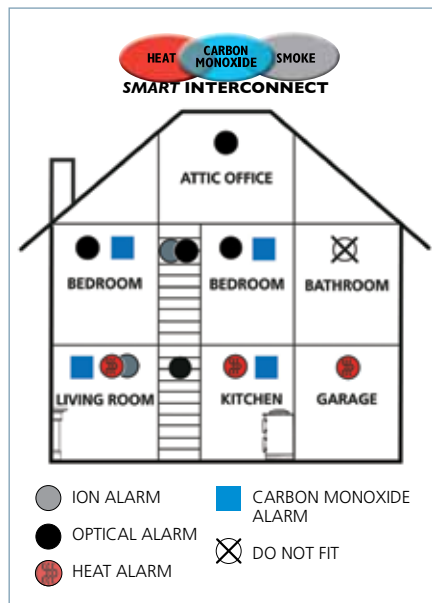
There has been discussion about requiring just one additional smoke alarm in the main or largest bedroom, interlinked with others in the home, primarily to act as a sounder. Of course, this proposed provision cannot ensure that a single additional smoke alarm is, in reality, located in the bedroom occupied by the family member best suited to react to an alarm. For example, research has shown that young children can sleep through loud alarms while elderly people and others with hearing impairments may also not respond.

There is therefore a compelling case for smoke alarms or sounders, interconnected with other alarms, in all bedrooms.

A System Approach with Smart Interconnect

The issue of audibility can be addressed cost-effectively with Kidde Fyrnetics' unique Smart Interconnect feature that forms a comprehensive system for whole-house protection. It enables a number of Kidde Fyrnetics hard-wired CO, smoke and heat alarms to be interconnected within a home. When a smoke/heat alarm is triggered by a fire, all the interconnected alarms – including CO alarms – activate to alert occupants of danger. When a CO alarm is triggered by carbon monoxide, all interconnected CO alarms activate.

The hard-wired CO alarms have different, distinct alarm sounder patterns for carbon monoxide and fire (as required by BS 5839 Part 6:2004) – supported by different digital display messages on one model. Using Smart Interconnect, Kidde CO alarms can be used in bedrooms as sounders for the smoke/heat alarm system as well as warning of carbon monoxide – a most cost-effective solution meeting Best Value criteria.



Unrivalled Product Choice

As the world leaders, manufacturing 35 million smoke, heat and carbon monoxide alarms every year, Kidde Fyrnetics offers an

unrivalled choice of products to suit every need in housing. Slick® is the only range of fast-fit rechargeable smoke and heat alarms guaranteed for 10 years – now including wireless interconnect capability and Remote Test & Hush switch accessory. Using Smart Interconnect, these units can be used in conjunction with Kidde Fyrnetics' hard-wired CO alarm range offering the very best, long-term quality and security, and digital display option. A cable-harness range of hard-wired smoke and heat alarms is also available, along with a wired remote Test and Hush switch accessory.

To view a video explaining installation of wireless Slick® alarms, scan the QR code or visit/click on: <http://www.youtube.com/watch?v=rVHdkVG-04Q&feature=youtu.be>



Kidde Fyrnetics offers an extensive range of battery powered CO and smoke alarms, for appropriate applications. In particular, the TenYCO and Ten-4 ranges offer full 10-year guarantees – including sealed-in, high performance batteries – and quick and simple installation by non-electricians. All Kidde Fyrnetics smoke, heat and CO alarms are BSi Kitemarked.

To view a video about carbon monoxide and fitting TenYCO alarms, visit/click on: <http://www.youtube.com/watch?v=waH1rXuEKOg&feature=youtu.be>

