Kidde Fyrnetics

helping housing providers meet their responsibilities to kerb the No 1 killer by accidental poisoning

Kidde Fyrnetics
CARBON MONOXIDE ALARM

FLASHING = ALARM
1 Flash = SERVICE

POWER

LOW BATTERY

TEST/ RESET

PEAK LEVEL

Parts per million of carbon monoxide displayed

Lb = Low battery

unique **HEAT CARBON MONOXIDE SMOKE** SMART INTERCONNECT feature

BSi Kitemarked   EN50291: 2001

integral back-up power   RECHARGEABLE LITHIUM-ION

fully guaranteed   ALARM GUARANTEE 6 YEARS

NEW

Hard Wired
Carbon Monoxide Alarms for homes

from the world leaders manufacturing 24 million CO, smoke and heat alarms every year

SMART INTERCONNECT — HEAT / CARBON MONOXIDE / SMOKE

EN50291: 2001

RECHARGEABLE LITHIUM -ION

ALARM GUARANTEE 6 YEARS

))Kidde Fyrnetics

Kidde Fyrnetics manufactures 24 million CO, smoke and heat alarms every year and has unrivalled expertise and commitment to ongoing research and development – with the resources to match as part of the $37 billion United Technologies (UTC) group. Our alarms are all Kitemarked and made in our ISO 9001 and 14001 certified factories. We have unrivalled expertise in CO detection, particularly in the USA where this problem has now been addressed by legislation.

The launch of our new range of hard-wired carbon monoxide alarms specifically for the UK market follows extensive development and testing. The range consists of two models: 423/9HIR and the digital alarm 423D/9HIR.

RECHARGEABLE LITHIUM -ION

)) New feature-packed Hard-wired CO alarms

Features of both models:

Our new range of hard-wired CO alarms consists of two models: 423/9HIR and the digital alarm 423D/9HIR. Both share an extensive range of features including:

))) mains powered with sealed-in, rechargeable lithium cells for back-up preventing tenant access

))) electrochemical sensor sampling air every 15 seconds – safer than others sampling every 60 seconds

))) unique Smart Interconnect allowing Kidde Fyrnetics hard-wired smoke, heat or CO alarms to be linked on one wiring network

))) neat circular design can be ceiling or wall mounted

))) product life of 7 years from initial power up and full guarantee for 6 years

))) quickly connects with snap-on harness and unit locks in place by default

))) easy to use test/reset buttons

))) separate easy to follow user and installer manuals included and also available on our website

Extra features of the 423D/9HIR model:

))) digital display showing the parts per million (ppm) when CO is detected, calculating the ppm and length of exposure time

))) peak recall feature can be used to call up the highest level (above 30 ppm) recorded since the button was last pressed

))) memory recall feature enables users to verify if there has been a CO incident in their absence which had ceased before their return

))) display indicates "Fire" if triggered by interconnected smoke/heat alarm, or"CO" if triggered by interconnected CO alarm
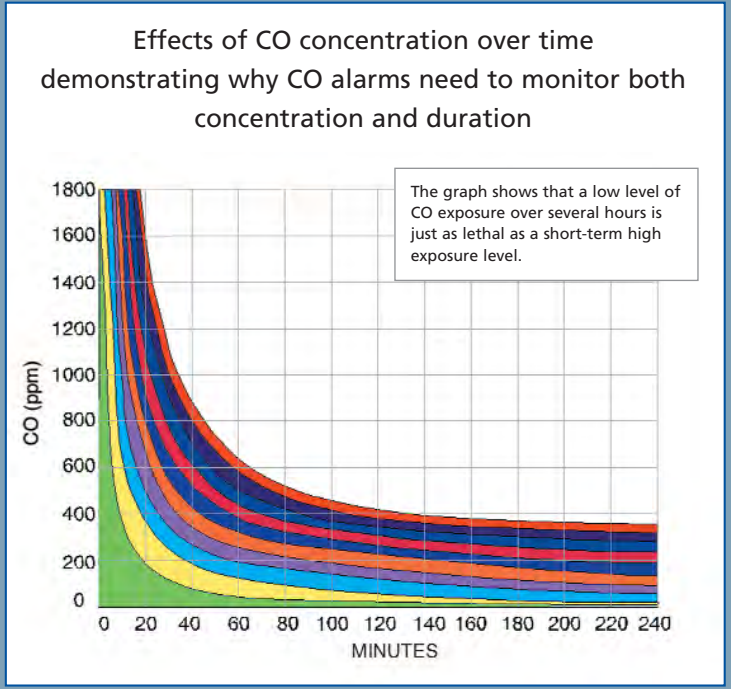
CO and human health

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 fatality and injury levels and all these figures reflect just what we know about: CO poisoning is certainly under-diagnosed by doctors and often not recognised 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.

Effects of CO concentration over time demonstrating why CO alarms need to monitor both concentration and duration

The graph shows that a low level of CO exposure over several hours is just as lethal as a short-term high exposure level.

Key

50% COhb			25%		Nausea+headache
45%	■	Death	20%	■	headache
40%	■	Coma/brain damage	15%	■	mild headache
35%	■	collapse	10%	■	none
30%	■	vomiting	5%	■	none
	■	drowsiness			

CO alarms – standards

The current standard for carbon monoxide alarms, BS7860, will cease to apply in April 2006 being replaced by European Standard BS EN 50291:2001 – a much tougher standard designed to increase safety and improve product integrity.

This incorporates aspects of the US standard UL2034 and requires CO alarms to trigger at lower concentrations than previously. While all newly designed CO alarms must comply, existing alarms complying only with the old BS are still available. Another new standard, BS EN 50292, will apply to selection, installation, use and maintenance – including siting.
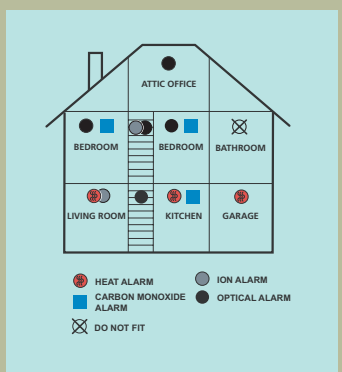

Kidde Fyrnetics CO alarms are also suitable for ceiling mounting thanks to their circular shape.

siting CO alarms

The number and locations of CO alarms will depend upon the dwelling layout. It is essential that carbon monoxide reaches the alarm from the source to trigger it and the alarm sounder must be capable of waking sleeping occupants. To achieve this with just one unit is difficult and a network of interlinked alarms – for example with the Kidde Fyrnetics Smart Interconnect feature - is preferable, with one alarm in each sleeping area and at least one on every level. CO alarms should never be installed in bathrooms, shower rooms, boiler rooms or garages.

The optimum positioning of a CO alarm within a room is discussed in the Kidde Fyrnetics CO alarm installation manuals and the latest installation standard, BS EN 50292. This makes use of work done by the BRE which shows that CO is normally emitted warm and so will tend to flow upwards, determining best locations as upper wall level or ceilings. The new Kidde Fyrnetics range can be ceiling or wall mounted.

Kidde Fyrnetics

HEAT | CARBON MONOXIDE | SMOKE
SMART INTERCONNECT

EN50291: 2001

RECHARGEABLE LITHIUM-ION

ALARM GUARANTEE 6 YEARS

)) SMART INTERCONNECT

Domestic alarms fulfil two essential functions: sensing carbon monoxide or a fire incident, then alerting occupants to danger with a loud sounder and other indicators. The unique Smart Interconnect feature enables a number of Kidde Fyrnetics hard-wired CO, smoke or 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, giving whole property protection. When a CO alarm is triggered by carbon monoxide, all the interconnected CO alarms activate. The new hard wired CO alarms have different, distinct alarm sounder patterns for carbon monoxide and fire - supported by different digital display messages on the 423D/9HIR model.

technical specification

Models –	423/9HIR and 423D/9HIR
BS Kitemarked to BS EN 50291: 2001	
CO Sensor –	Electrochemical
Electrical rating –	230V AC; 50Hz; 30mA max per alarm
Back-up –	8.2V
Audio Alarm –	85 dB at 3m
Temperature Range –	4^OC to 38^OC
Humidity Range –	5% to 95% RH
Wiring –	in accordance with the latest IEE Regulations, BS7671, via a supplied cable harness
Dimensions –	base diameter 144mm; alarm diameter 147mm; depth 42mm
Weight –	350g
Guarantee –	6-years
Replacement –	7 years after commissioning

The SMK23 Surface Pattress can be used if necessary.

activation times related to CO levels

CO Concentration Parts per million (ppm):	Activation time (mins):
<30 ppm	no alarm
70 ppm	60-240 mins
150 ppm	10-50 mins
400ppm	4-15 mins

Suggested Specification clauses

The alarm to be BS Kitemarked to BS EN 50291:2000.

The alarm to be capable of interconnection to other Kidde hard wired compatible smoke, heat and CO alarm units, and have a sealed-in rechargeable lithium supply.

The alarm to be capable of wall or ceiling mounting, using a surface mount pattress {Kidde part SMK23} or in new build, a dry lining box.

The alarm shall utilise a piezo horn that is rated at 85 decibels at 3m and shall have reset & test button.

The alarm shall incorporate 3 LED's: a green LED will be steady on when AC power is present and will flash every 7 seconds when in the battery only mode; a red LED will flash in unison with the sounder pattern for either a smoke or CO incident, flash once every 30 seconds if the alarm needs service or be steady on if the alarm is in error mode; an amber LED will illuminate if that unit is the originating alarm in a CO incident.

The alarm shall indicate a low battery warning by issuing a brief alarm chirp and the red LED will then flash approximately every 15 seconds.

When the alarm detects carbon monoxide, the alarm pattern will be four (4) short beeps – followed by five (5) seconds of silence – followed by four (4) short beeps.

The unit shall include a peak level memory feature that will store the peak CO level sensed since the alarm was last reset. The peak CO level stored in the unit's memory shall be displayed (in ppm) on the digital display by pressing the appropriate button on the unit.

The alarm shall incorporate the "Smart Interconnect" feature that allows it to respond to a smoke/heat incident when interconnected with Smoke or Heat alarms. During a smoke/heat incident, the alarm will sound in the required, repetitive manner of a smoke alarm – three (3) beeps, a pause, three (3) beeps, a pause.

The digital display will also scroll the word "FirE" across the display.

The whole alarm shall be guaranteed for 6 years.

The alarm will be shipped in a sealed polythene sleeve within its outer packaging, to prevent any contamination during transportation, and shall include separate User & Installer manuals.

The alarm shall be installed in accordance with the manufacturers instructions, BS EN 50292, Part P of the Building Regulations and the latest IEE Regulations i.e. 16th edition [BS7671].
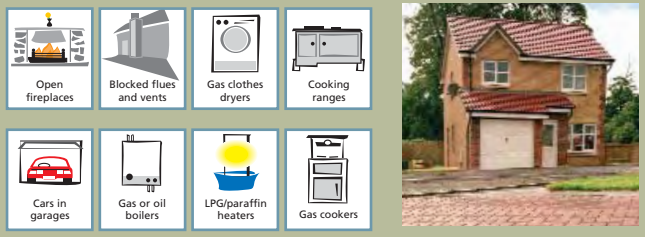
NOTE: Highlighted text applies to the digital 423D/9HIR model only.

recognised sources of CO in the home

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 appliances such as fireplaces and ovens. Other unfixed appliances introduced by occupiers are also a danger, including LPG and paraffin heaters, clothes dryers and charcoal or gas grills and hibachis operated in enclosed spaces.

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, especially when below a bedroom.

Open fireplaces	Blocked flues and vents	Gas clothes dryers	Cooking ranges
Cars in garages	Gas or oil boilers	LPG/paraffin heaters	Gas cookers

the wider risk from CO

The main difficulty with CO is that the dangers are often far from obvious. Shared flues can cause unexpected problems and there have been instances of CO from flues discharging onto common areas effecting neighbouring properties, whether alongside or above the source – sometimes with lethal consequences. In other cases, flue outlets have been interfered with by, for example, 'pirate radio' station operators while fixing illegal antennae on apartment blocks. A wide diversity of other CO poisoning sources have also been recorded ranging from barbecues operated in confined spaces to fast food shop outlets effecting neighbours.

In addition to poor maintenance or sub-standard fittings, flues and vents, other factors can have a serious impact. These factors include 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).

susceptible properties

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. The idea that it is limited to just older buildings, poorer households and student 'digs' is entirely false.

Today, things are also being made worse by installation of double-glazing and the sealing up of buildings for energy conservation, so reducing scope for air intake. Further changes to Part L (energy conservation) and Part F (ventilation) of the Building Regulations – and similar measures in Scotland - will continue this trend in new homes. Here, moves towards air-tight buildings with controlled ventilation will make the domestic environment more sensitive to air pressure changes, so increasing the risk of CO from heating appliances.

the case for CO alarms

While nothing can replace an effective heating maintenance programme, the case for CO alarms is compelling. In both public and private rented sectors, landlords are increasingly encountering tenant-resistance to access for regular heating inspection and maintenance. In owner occupied properties, there is no compulsion for heating installations to be maintained.

In any event, as we have seen a huge diversity of factors can lead to the presence of CO in any home – new or old – and it is impossible to predict and prevent all possible scenarios. The latest CO alarms provide an audible warning at exposure levels well below those critical to healthy adults and are invaluable in the fight against CO poisoning. For the low costs involved in fitting CO alarms, there really is no reason preventing their widespread use.

decent homes and HHSRS

For social housing, the government intends to replace the Decent Homes 'Fitness Standard' (which did not refer to carbon monoxide poisoning) with the Housing Health and Safety Rating System (HHSRS) which focuses more on health and safety risks. The published HHSRS specifically identifies carbon monoxide and fuel combustion products as 'Category 1' hazards and specifies properly sited and maintained CO alarms as an optimum preventative measure for landlords to carry out.

The government will require that a 'decent home' is free of all Category 1 hazards and seeks to ensure that all social housing meets the standard by 2010. The HHSRS also provides a useful benchmark for assessing housing standards in the private sector.

legislation and legal responsibilities

Local Authority pays out £380,000 after two tenants die of carbon monoxide poisoning

THE LONDON Borough of Hammersmith and Fulham has been ordered to pay out a total of £380,000 in fines and costs after a court heard how

BLACKFRIARS Crown Court

The court also heard that sealed-unit boilers designed to die to a breakdown in the

The London Borough of Hammersmith and Fulham was fined £200,000 under Section 3(1) of the Health and

There are currently no Building Regulations requiring CO alarms in any homes and urgent action is needed to prevent the continuing toll of deaths and serious injuries which occur despite our strong gas safety and heating installation regulations. The UK is not alone in being confronted with this problem. In the USA, similar proportions of the population to the UK are killed or injured by CO (in 2003, 13 people died in New York alone) but – in contrast to the UK - a growing number of American states are now making CO alarms mandatory in virtually all housing.

As a first step, CO alarms should be fitted in all registered social housing properties and consideration given to the private rented sector as well, as these are most at risk. But an addition to the Building Regulations to require hard-wired CO alarms in all homes must surely be the eventual goal. Even in the absence of specific legislation, landlords have a responsibility today under civil law to take reasonable steps to protect tenants and face substantial damages in the event of CO poisoning. Kidde Fyrnetics has obtained an expert legal opinion on this, available on request.

Hard-wired Carbon Monoxide Alarms

Model no	Display Window	AC Power	Memory	Wall or Ceiling Mount	Rechargeable back-up	Unit/Back up guarantee	Dimensions	Hush button	Interconnectable to Kidde hard-wired smoke & heat alarms
423D/9HIR	✓	✓	✓	✓	✓	6 years	146 x 46	✓	✓
423/9HIR	–	✓	–	✓	✓	6 years	146 x 46	✓	✓

Battery Powered Carbon Monoxide Alarms

Model no	Display Window	Power	Memory	Wall or Ceiling Mount	Unit guarantee	Dimensions	Hush button	Interconnectable to Kidde hard-wired smoke & heat alarms
9CO5UK	–	DC	–	✓	5 years	140 x 38	✓	–
900-0146UK	✓	DC	✓	✓	5 years	140 x 38	✓	–

SLICK® fast-fit Hard-wired Smoke and heat alarms

Model no	Alarm type	AC Power	Alkaline back-up	Rechargeable back-up	Unit guarantee	Back-up guarantee	Hush button	Interconnect x12	x24
1SF23/9HIR	Ionisation	✓	–	✓	10 years	10 years	✓	–	✓
1SF23/9HI	Ionisation	✓	✓	–	6 years	–	✓	–	✓
2SF23/9HIR	Optical	✓	–	✓	10 years	10 years	✓	–	✓
2SF23/9HI	Optical	✓	✓	–	6 years	–	✓	–	✓
3SF23/9HIR	Heat	✓	–	✓	10 years	10 years	✓	–	✓
3SF23/9HI	Heat	✓	✓	–	6 years	–	✓	–	✓

Original range Hard-wired Smoke and Heat Alarms

Model no	Alarm type	AC Power	Alkaline back-up	Long life back-up	Unit guarantee	Back-up guarantee	Hush button	Interconnect x12	x24
123/9HILL	Ionisation	✓	–	✓	10 years	10 years	✓	–	✓
123/9HI	Ionisation	✓	✓	–	6 years	–	✓	–	✓
123I	Ionisation	✓	–	–	6 years	–	–	–	✓
223/9HILL	Optical	✓	–	✓	10 years	10 years	✓	–	✓
223/9HI	Optical	✓	✓	–	6 years	–	✓	–	✓
223I	Optical	✓	–	–	6 years	–	–	–	✓
323/9HILL	Heat	✓	–	✓	10 years	10 years	✓	–	✓
323/9HI	Heat	✓	✓	–	6 years	–	✓	–	✓
SMK23	Surface mount pattress suitable for all alarms								

Interconnectable DC Powered Smoke Alarms

Model no	Alarm type	AC Power	Alkaline back-up	Long life back-up	Unit guarantee	Back-up guarantee	Hush button	Interconnect x12	x24
19HILL	Ionisation	DC	–	✓	10 years	10 years	✓	✓	–
19HI	Ionisation	DC	✓	–	5 years	–	✓	✓	–
29HILL	Optical	DC	–	✓	5 years	5 years	✓	✓	–
29I	Optical	DC	✓	–	5 years	–	–	✓	–

▶ = Sealed in back-up

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