



Housing Health and Safety Rating System (HHSRS)

Case Studies

Group B
Physiological
Requirements

Hazard B13
Indoor
Air Pollutants

Example B13.2
1920-45
Single-storey
House
(Non-HMO)

Vulnerable Group
Persons of all ages

Multiple Locations
Yes

Related Hazards
No

Dwelling

Description of Dwelling

The property is an early 1920s, detached, single-storey cottage in a rural location off the mains-gas grid. The dwelling has a kitchen-diner, hall, bedroom and living room. There is an attached garage/workshop with room for two cars, which opens off the inner hall.

The property has solid brick walls and a slate roof. New uPVC windows were fitted in the early 2000s when the property was refurbished (including re-wiring). There is an immersion heater for the hot water and the tenant also has an electric cooker. There is one battery powered smoke alarm in the internal hall.



1

Front exterior

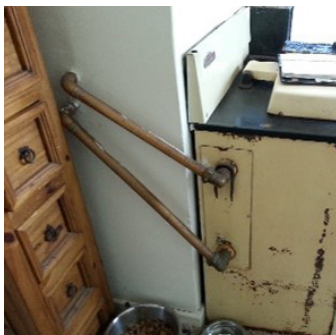
Photo credit: John And
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Deficiencies

Description of Deficiencies

Heating provision for the property is via a solid-fuel stove in the kitchen-diner. The stove has a vertical flue and no cowl, and heats radiators in the bedroom, living room and bathroom. The fire clay around the base of the flue is badly cracked and loose. The flue itself vents into the chimney stack but is in a poor condition, as are the seals around the oven and fire-box doors. There are no instructions for the use of the stove, and the tenant is under the impression it can burn any wood, coal or coke available. There are no airbricks or trickle vents in the windows and no mechanical extract ventilation.

No carbon monoxide alarm had been provided at the time of the inspection. The stove is used continually, apart from in the summer, as the main heating source as free fuel is available to the tenant. There are no service records for the stove.



2
Solid fuel stove in kitchen



3
Close up of stove front



4
Cracked clay around base
of flue

Relevant Baseline Indicators

0

Satisfactory
or N/A

1

Not
Satisfactory

2

Defective

3

Seriously
Defective

Subject	Score	BI	Baseline Indicator
4	Sanitary Facilities: Bathroom	0 1 2 3	4.8 Ventilation for the bathroom must be provided by mechanical extraction that is ducted to the outside of the building, in line with Baseline Indicator 16.1.
5	Sanitary Facilities: Kitchen	0 1 2 3	5.4 For cooking food, a 4-ring hob (or 2-ring in bedsit-type accommodation) with oven and grill properly installed with all necessary connections for safe and efficient operation, which shall be maintained in good working condition.
		0 1 2 3	5.6 Suitable facilities for the effective and safe removal of fumes and moisture-laden air to the external air by means of a cooker hood or extractor fan; a cooker hood that only recycles the odour through an active carbon filter would not be acceptable, it must vent to outside. A mechanical extractor would be the normal mechanism for this function, in line with Baseline Indicator 16.1.
15	Heating and Insulation	0 1 2 3	15.4 Every dwelling shall have a properly installed heating system in good and safe working condition that is capable of safely and adequately heating all habitable rooms, bathrooms and toilet rooms. The system must be capable of heating the main living area to 21°C and the remaining habitable rooms to a temperature of 18°C when the external temperature is minus 1°C, and the system should not allow the temperature to exceed 25°C in any room during the heating season.
		0 1 2 3	15.6 Water heaters, wood stoves and other devices that employ combustion-burning fuel shall be vented to the outside of the structure in an approved manner that meets the manufacturer specification and in compliance with applicable standards and shall be supplied with sufficient air to support the continuous complete combustion of fuel and prevent back-drafting or the emission of harmful gases to any internal or enclosed spaces. The chimney must be maintained in accordance with the manufacturer requirements, including sweeping and inspection.
		0 1 2 3	15.7 Where appropriate (when burning fossil fuels as heating, hot water provisions, or cooking) a hard-wired CO detector with battery back-up must be installed in the room containing the appliance.

Relevant Baseline Indicators
(continued)

0

Satisfactory
or N/A

1

Not
Satisfactory

2

Defective

3

Seriously
Defective

Subject	Score	BI	Baseline Indicator
16 Ventilation	0 1 2 3	16.1	The air exhausted from a bathroom, toilet room, kitchen, clothes dryer or basement must be provided by mechanical ventilation or by a correctly designed and installed natural ventilation system, as required by Part F of the Building Regulations. In addition it shall not be vented into any other parts of the building's habitable space or an attic; such air shall discharge directly to the outdoors but not near any intake on the building exterior.
	0 1 2 3	16.2	All habitable rooms must have at least one window, door or skylight which opens to the outside and can be fixed in an open position. In addition, ventilation may also be provided by the presence of trickle vents, air bricks or passive stack ventilation.
	0 1 2 3	16.3	In each habitable room, the size of the openable windows, doors and skylights together must be at least 5% of the floor area of that room.
	0 1 2 3	16.4	All means of ventilation shall be maintained in good repair and working order.
19 Fire Safety	0 1 2 3	19.5	There should be sufficient, properly designed and appropriately sited smoke and heat detectors with alarms in every dwelling. These should be properly maintained and regularly tested.

Other Relevant Matters

0

Satisfactory or N/A

1

Not Satisfactory

2

Defective

3

Seriously Defective

Score					Matters affecting Likelihood of Harm
0	1	2	3		Appliance siting
0	1	2	3		Detectors
0	1	2	3		Flueless appliances
0	1	2	3		Flue outlet siting
0	1	2	3		Extractor fans
0	1	2	3		Lobby ventilation
0	1	2	3		VOC emitting
0	1	2	3		Use of biocides
0	1	2	3		Dwelling location

Score					Matters affecting Harm Outcomes
0	1	2	3		Appliance siting
0	1	2	3		Detectors
0	1	2	3		Flueless appliances
0	1	2	3		Flue outlet siting
0	1	2	3		Extractor fans
0	1	2	3		Lobby ventilation
0	1	2	3		VOC emitting
0	1	2	3		Use of biocides
0	1	2	3		Dwelling location

Likelihood of Harm

Scale Points Likelihood of harm from this hazard over the next twelve months	
Very Likely	1 in 1
	1 in 2
	Example Dwelling 1 in 3
	1 in 5
Likely	1 in 10
	1 in 20
	1 in 30
	1 in 50
Unlikely	1 in 100
	1 in 200
	1 in 300
	1 in 500
Very Unlikely	1 in 1,000
	National Average 1 in 2,000
	1 in 3,000
	1 in 5,000
Score 1 in 3	

Justification of Scoring
Likelihood of Harm

The solid-fuel stove, being the heating source for the dwelling, is in constant use for the majority of the year. Unfortunately, this stove has not been maintained sufficiently and is in a state of disrepair. The fire clay around the base of the flue is badly cracked and loose. The flue itself is in poor condition, as are the seals around the oven and fire-box doors. The lack of a cowl to prevent backflow due to weather conditions and the disrepair to the flue means that there is an increased likelihood that combustion by-products will be released into the indoor environment.

There are no instructions for the use of the stove, nor are there any details of the correct material to burn on it, and it doesn't have any servicing records. The use of inappropriate fuels may be less efficient in terms of combustion, leading to increased levels of by-products.

There are no trickle vents to the windows, air bricks are not present, and there is no secondary ventilation in the kitchen; so it is likely that there is insufficient air to support the continuous complete combustion of fuel and prevent back-drafting or the emission of harmful gases into the kitchen/diner.

When combined, these factors will lead to the release of particulates and other indoor air pollutants into the kitchen/diner. These pollutants could conceivably build up and spread through the rest of the dwelling. The lack of CO detection will enable this build-up to go undetected unless occupiers' symptoms are recognised.

Consequently, the likelihood has been significantly increased to reflect the disrepair and the deficiencies identified above, as the stove will be heavily used for the majority of the subsequent 12-month assessment period.

Harm Outcomes

Extreme		Severe		Serious		Moderate	
Death, permanent paralysis, etc.		Heart attack, serious fractures, etc.		Chronic stress, severe concussion, etc.		Broken fingers, moderate cuts, etc.	
Very Likely	50.0	Very Likely	50.0	Very Likely	50.0	Example Dwelling 88.0 National Average 98.0 These scores are simply calculated as the sum of the other three harm outcomes subtracted from 100%	
	30.0		30.0		30.0		
	20.0		20.0		20.0		
Likely	10.0	Likely	10.0	Likely	10.0		
	5.0		Example Dwelling 5.0		Example Dwelling 5.0		
Example Dwelling	2.0		2.0	National Average	2.0		
Unlikely	1.0	Unlikely	1.0	Unlikely	1.0		
	0.5		0.5		0.5		
	0.2		0.2		0.2		
Very Unlikely	0.1	Very Unlikely	0.1	Very Unlikely	0.1		
National Average	0.0	National Average	0.0		0.0		
Score 2.0%		Score 5.0%		Score 5.0%		Score 88.0%	

Justification of Scoring

Harm Outcomes

The lack of a carbon monoxide detector will mean there is no prior warning of dangerous levels of CO. As symptoms of CO poisoning are often confused with other common illnesses such as headaches and dizziness, any occupant is unlikely to take proactive steps towards a diagnosis for possible poisoning by this gas. Consequently the extreme, severe and serious harm outcomes have been increased to reflect this.

Safety Ratings

Scenario 1
As described in this document

Key

Category	Band	Score
1 Legal duty to take action	High	10,000
2 Discretion to take action	Medium	1,000
	Low	100

Likelihood of Harm 1 in 3			
Extreme 2.0%	Severe 5.0%	Serious 5.0%	Moderate 88.0%
Category	Band	Score	
1 Legal duty to take action	High	10,000	
	Example Dwelling	9,127	
2 Discretion to take action	Medium	1,000	
	Low	100	
Score		National Average	1
9,127			

Scenario 2

After works meeting baseline indicators

Likelihood of Harm
1 in 1,000

Extreme 0.0%	Severe 0.0%	Serious 2.0%	Moderate 98.0%
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Category	Band	Score
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1 Legal duty to take action	High	10,000
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2 Discretion to take action	Medium	1,000
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	Low	100
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Example	27
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Score 27	National Average	1
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Scenario 3

After further improvements

Likelihood of Harm
1 in 2,000

Extreme 0.0%	Severe 0.0%	Serious 2.0%	Moderate 98.0%
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Category	Band	Score
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1 Legal duty to take action	High	10,000
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2 Discretion to take action	Medium	1,000
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	Low	100
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Score 1	Example Dwelling + National Average	1
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Justification of Scoring

After works meeting baseline indicators

The requirements set out in BIs 15.4 and 15.6 should be implemented, ensuring the solid-fuel appliance is compliant with relevant standards and is properly maintained, and includes the provision of sufficient air flow to the room hosting the appliance and extract ventilation in both kitchen and bathroom. Trickle vents would also be installed in the windows for background ventilation. The occupants will be alerted to any carbon monoxide emissions by the presence of a detector, as required by BI 19.5. These measures will reduce the likelihood of a harmful occurrence significantly and return to the class of harm outcomes to the national averages for the dwelling type and age. The score will not however return to the average as the lack of instruction leaves the occupant vulnerable to sub-optimal use, which has the potential to increase the levels of combustion products and reduce the efficiency of ventilation. There is a lack of lobby between the garage and the living accommodation.

Justification of Scoring

After further improvements

Ideally, a lobby should be installed between the garage and the living accommodation.

The current occupants should be provided with an instruction manual for the solid-fuel appliance and general advice should be given regarding optimum use of the appliance. This information should be provided to each new tenant.

Other Relevant Legislation and Guidance

Smoke and Carbon Monoxide Regulations

The Smoke and Carbon Monoxide Alarm (England) Regulations 2015 require landlords of non-licensable dwellings to fit a smoke alarm on each storey of their homes where there is a room used as living accommodation, and a carbon monoxide alarm in any room used as living accommodation which contains a fixed combustion appliance (excluding gas cookers). They must also ensure smoke alarms and carbon monoxide alarms are repaired or replaced once informed and found that they are faulty.

Updates

Matters for consideration listed in this section were correct at the time of publication. For the most up-to-date legislation and guidance in these areas, please visit the [gov.uk](https://www.gov.uk) website.