



Housing Health and Safety Rating System (HHSRS)

Case Studies

Group B
Physiological
Requirements

Hazard B13
Indoor
Air Pollutants

Example B13.4
Post-1979
Semi-detached House
(Non-HMO)

Vulnerable Group
Persons of all ages

Multiple Locations
Yes

Related Hazard A4
Fire and Explosions



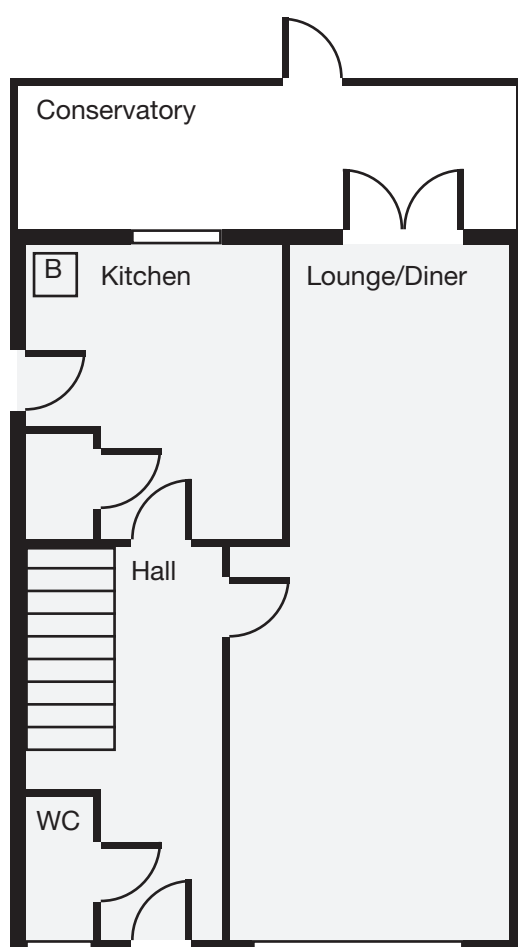
Dwelling

Description of Dwelling

This is a three-bedroomed, two-storey, semi-detached house. It was built in the mid-1980s and is occupied by a single family.

The structure of the dwelling comprises insulated cavity brick walls under a concrete tiled roof. There are double-glazed windows with trickle vents and large side-opening casements.

There is no gas safety certificate or electrical installation condition report. The EPC is D rated. The cooker in the kitchen is electric.



1
Front exterior

2
Floorplan

Deficiencies

Description of Deficiencies

Heating and hot water for the property are provided by a combi gas boiler located in a cupboard that is built into the corner of the kitchen (identified as 'B' on the plan above). The boiler flue discharges into the conservatory. The inspection cap has been left off the boiler flue at the point where it leaves the boiler, allowing combustion products back into the cupboard.

A conservatory has been constructed across the back of the house, covering the kitchen windows and the patio door of the adjacent lounge/diner. There are no other openable windows to these rooms, but there is an extractor fan to the kitchen which vents into the conservatory. There is one small top-opening window in the conservatory and a door into the back garden.

There is no carbon monoxide alarm.



Boiler flue location

3
Rear exterior showing
conservatory

Relevant Baseline Indicators

0

Satisfactory
or N/A

1

Not
Satisfactory

2

Defective

3

Seriously
Defective

Subject	Score	BI	Baseline Indicator
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.
		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.
14	Lighting and Service 0 1 2 3	14.5	Gas appliances and flues provided for occupants are safe for continued use.
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.
		15.7	Where appropriate (when burning fossil fuels as heating, hot water provision, or cooking) a hard-wired CO detector with battery back-up must be installed in the room containing the appliance.
16	Ventilation 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.
		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.
		16.4	All means of ventilation shall be maintained in good repair and working order.

Relevant Baseline Indicators
(continued)

0

Satisfactory
or N/A

1

Not
Satisfactory

2

Defective

3

Seriously
Defective

Subject		Score				BI	Baseline Indicator
19	Fire Safety	0	1	2	3	19.3	An annual gas safety check should have been undertaken within the last 12 months with a satisfactory result. Any heating provided by LPG shall be inspected annually by a suitably qualified engineer.

Other Relevant Matters

0

Satisfactory or N/A

1

Not Satisfactory

2

Defective

3

Seriously Defective

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

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
	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
	1 in 2,000
	1 in 3,000
	1 in 5,000
Score 1 in 3	

Justification of Scoring
Likelihood of Harm

The absent inspection cap on the boiler is allowing combustion products to escape into the kitchen cupboard, and the boiler flue is discharging into the conservatory rather than externally. The combi boiler is the only source of hot water, so it will be in daily use even in the summer, meaning there will be continuous exposure to exhaust gases in the ground floor habitable rooms where there is no direct ventilation to the outside.

In the absence of a CO alarm, there is potential for the build-up of high concentrations of combustion products without detection, overall giving a significant likelihood of a harmful occurrence over a 12-month 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 92.0 National Average 94.9 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		5.0		Example Dwelling + National Average 5.0		
	2.0		2.0				
Example Dwelling	1.0	Unlikely	1.0	Unlikely	1.0		
	0.5		0.5		0.5		
	0.2		0.2		0.2		
National Average	0.1	National Average	0.1	Very Unlikely	0.1		
	0.0		0.0		0.0		
Score 1.0%		Score 2.0%		Score 5.0%		Score 92.0%	

Justification of Scoring

Harm Outcomes

The gas boiler flue, which provides all heating and hot water, discharges combustion products into the kitchen, conservatory and lounge/diner. The boiler will be in use throughout the year, particularly in the cold winter months, when the conservatory window and door are likely to be kept closed. This will increase the likelihood of extreme, severe and moderate harm due to the high concentration of harmful gases and particulates within the property.

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 1.0%	Severe 2.0%	Serious 5.0%	Moderate 92.0%
Category	Band	Score				
1 Legal duty to take action	High	10,000				
	Example Dwelling	4,807				
2 Discretion to take action	Medium	1,000				
	Low	100				

Score

National
Average

4,807

1

Scenario 2

After works meeting baseline indicators

Likelihood of Harm
1 in 5,000

Extreme	Severe	Serious	Moderate
0.1%	0.1%	5.0%	94.9%

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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Scenario 3

After further improvements

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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Justification of Scoring

After works meeting baseline indicators

The baseline indicators require that gas appliances and flues are safe for continued use and that an annual gas safety inspection is carried out; therefore, a Gas Safe registered engineer should be employed to inspect the boiler and flue.

Refitting the inspection cap on the flue and extending it so as to discharge to the open air will eliminate the build-up of combustion products in the house. A hard-wired CO detector must be installed in the room with the boiler and works should be carried out to ensure that habitable rooms have at least one door or window opening to the outside – this could be achieved either by changing the window to the front elevation of the living room to one that opens or by removing the conservatory.

Justification of Scoring

After further improvements

Further improvements are not required.

Other Relevant Legislation and Guidance

Smoke and Carbon Monoxide Regulations

The Smoke and Carbon Monoxide Alarm (England) Regulations 2015 would not apply in this case as the property was owner/occupied at the time of assessment. If the property is rented again in the future, 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.