TN_0022

HETAS Technical Note – TN_0022 - CO Alarm Selection & Positioning

Questions from installers over the type, suitability and positioning of carbon monoxide alarms continue to be a regular occurrence on the HETAS technical helpline. There is confusion caused by differing guidance and advice on suitable positioning given within UK Building Regulation approved documents and CO alarm manufacturer installation instructions. When installed, operated and maintained correctly, instances of solid fuel appliance CO spillage are rare, nonetheless the Building Regulations still require all new or replacement solid fuel appliance installations to permanently affix a CO alarm in the room in which the appliance is located.

Improper selection and location of an alarm may result in CO detection being limited, leading to an increase in the time taken for CO activation upon spillage occurring and decrease in time available for occupants to vacate the building safely.

What do the Building Regulations Say?

Approved Document J of the Building Regulations lays out the statutory requirements for installations of solid fuel appliances. In particular regulation J3 states the following:

Warning of Release of Carbon Monoxide

J3. Where a fixed combustion appliance is provided, appropriate provision shall be made to detect and give warning of the release of carbon monoxide.

The regulations are clear in laying out the conditions for ensuring a CO alarm compliant with BS EN 50291 is present upon installation of a solid fuel appliance, however establishing the suitable type, position and fixing method is where confusion can exist between current appropriate standards and alarm manufacturers' installation instructions.

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Supplementary Information on Selection & Positioning

As well as the statutory requirements detailed on page 9 of ADJ, further information can be found within:

- ✔ Clause 2.34 to 2.36 of Approved Document J
- ✔ Supplementary product and installation standards including BS EN 50292 & BS 8303
- ✔ Alarm Manufacturer Instructions

Although the regulations simply require appropriate provision to be made, it is important for the general safety of the occupants that installers and landlords are selecting and positioning an alarm effectively allowing the quickest response time from the alarm for the occupants to vacate the premises. This document details some of the best practice considerations and should be followed as closely as possible It is worth noting that manufacturers who supply alarms do so for a number of different technology types, so guidance provided may cover suitable provisions for a range of appliances.

Best Practice

Confusion around the appropriate selection and positioning of a CO alarm normally comes about where the installer or landlord are being provided conflicting advice from a variety of sources.

It is important for the installer or landlord to understand the behaviour of CO emissions to assess in practice the best location of the alarm. In principle, CO has almost the same density as air and would be emitted as part of spillage of combustion products which are hot and will warm the air around the appliance. This warmer air is likely to rise due to its buoyant characteristics, which supports best practice measures and those given within regulatory guideline in positioning the CO alarm at a high position on the wall or on the ceiling.

Whilst complying with J3 of the Building Regulations, it is important to ensure the CO alarm is of a suitable type and positioned in a suitable location as to provide the best warning of CO upon spillage.

The referenced provisions below allow for the installer/landlord to competently enforce best practice on the selection and positioning within a room containing a solid fuel appliance.

Product Selection - Alarm Type

A suitable alarm will have been tested to confirm it meets the necessary requirements of BS EN 50291:2010, and activate within the required time when the relevant volume of CO is detected. The alarm packaging itself will contain the relevant information, including appropriate Kitemark reference (if tested by BSI) and also confirmation of the test method standard, warning of the expected lifetime of the sensor and where incorporated stating the product includes an end of life indication.

Sealed for life vs Replaceable

There are currently three known types of alarm on the market, which are:

- Sealed for Life: Alarms that have a fixed, sealed power source which will require complete replacement once the end of life which is normally a minimum of 5 years
- Replaceable battery: Alarms that have a replaceable power source
- Mains powered: Alarms normally powered by wired mains electricity but containing a back-up battery for mains failure events

It is important to note that any of these three types of CO alarm are suitable for use with solid fuel installations. If they have been confirmed as meeting the requirements of BS EN 50291 then they shall incorporate a warning device to alert users when the working life of the alarm is coming to an end. It is important for any installer landlord to ensure that they educate the consumer in knowing what action to take when the alarm sounds, and that the end-of-life warning means the unit or battery will need to be replaced and new alarm tested immediately. Landlords and installers can further educate the consumer or tenant by ensuring a test of the operation of the alarm is undertaken on a regular basis.

All manufacturer's alarms compliant with BS EN 50291 will contain a "test button" which when pressed will sound an audible alarm and flash its LEDs to show that the alarm is correctly operating.

Alarm Positioning

The general provisions within ADJ and BS8303 ask that the CO alarm be positioned in a location which provides means for the immediate detection of CO upon spillage from a solid fuel appliance. Guidance in ADJ and in BS8303 is that CO alarms should be positioned as follows;

a) **On the ceiling at least 300mm from any wall or, if it is located on a wall as high up as possible (above any doors or windows) but not within 150mm of the celling; and**

b) **Between 1m and 3m horizontally from the appliance**

These stated parameters allow for the earliest possible detection of CO as the combustion products disperse and mix with the air within the room. In these positions the detector is also avoiding the relevant "dead zone" areas whereby the velocity of gases disperse and convect in a circular motion and do not reach the corner areas of the room. It is also important to ensure CO alarms are not located directly next to the appliance, or within areas where air disperses at a slower rate. Typically installations of solid fuel appliances are within a builder's recess, where the flue is contained within a masonry chimney stack which protrudes slightly into the room in which the appliance is installed. Following best practice, it is also recommended for CO alarms not to be located on the side wall of the masonry stack, which again acts as a potential "dead zone", which may increase the activation response time of the alarm as the CO disperses into the room in a radiant motion.

Diagram 1 on page 6 & 7 gives a basic breakdown of the suitable positions & best practice positions in where to place the alarm in the room in which the appliance is installed.

Landlord Requirements

Since the 1st October 2015, regulations now require landlords in England to ensure a co alarm is fitted in any room containing a solid fuel appliance within rented residential accommodation. This applies to both new and existing installations and failure to follow the new legislation can lead to a civil penalty being imposed on the landlord, whose responsibility it is to ensure compliance. Regulations in Scotland and Northern Ireland require similar CO alarm provision. Landlords will be required to check the condition and operation of the alarm at the beginning of each tenancy, however the regulations do not provide information of the placement of alarms, only that the landlord follows the provided guidance within Building Regulations, standards and CO alarm manufacturer's instructions.

Affixing the Alarm

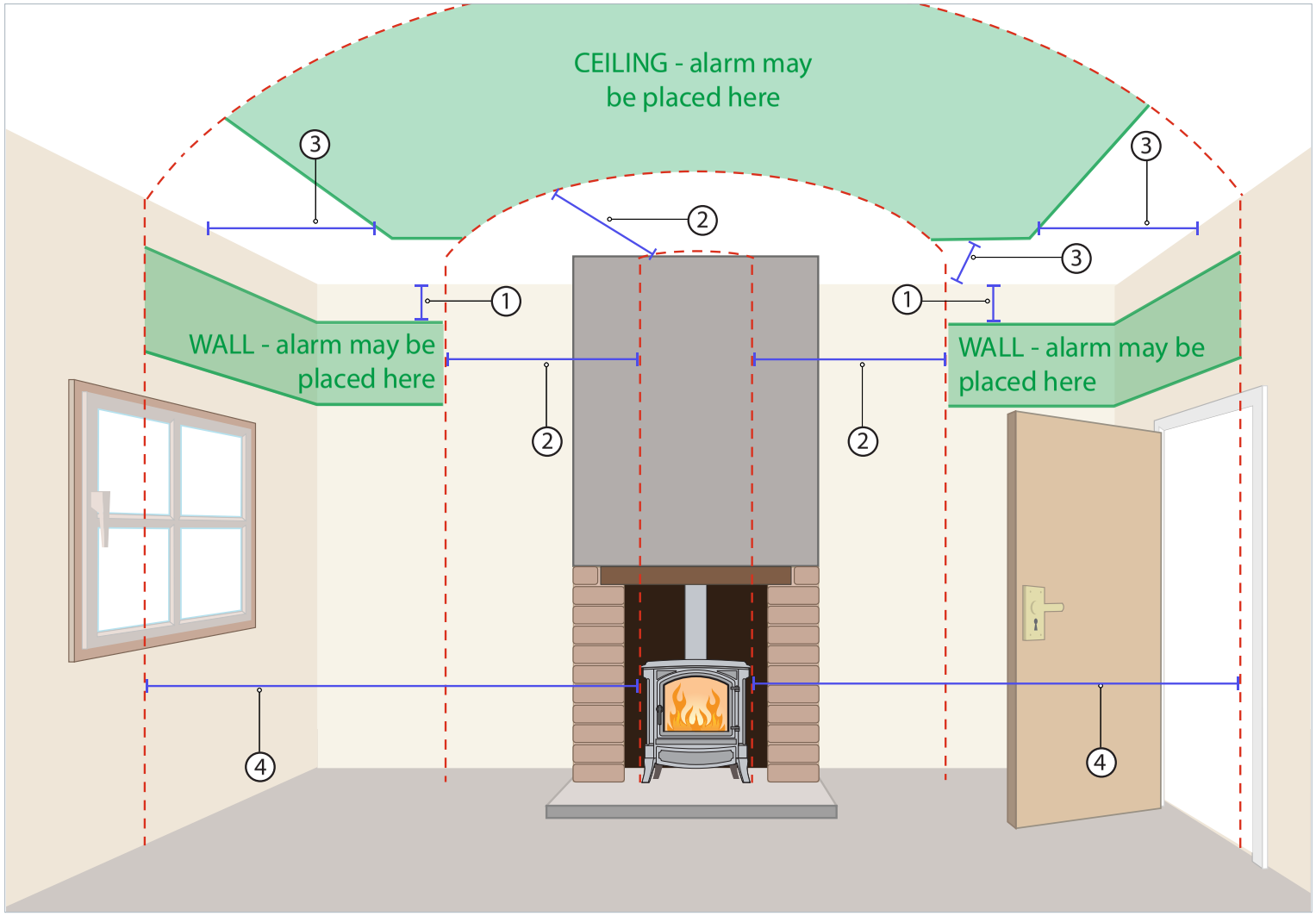
The regulations currently state that "appropriate provision shall be made to detect and give warning of the release of CO". Having checked with the Government Department responsible, we can state that "appropriate provision" is seen as permanently affixing a suitable alarm to the wall/ceiling in an appropriate place, and that simply leaving an alarm with a customer is not seen as "appropriate provision". It is vital for the installer to educate the consumer in the importance of the alarm, its position and what to do when the alarm sounds. This document can be used as evidence of the things to be considered and the reasoning behind the requirements. This important information can be relayed to the consumer as part of the commission and handover process.

Further Information

CoGDEM
The Council of Gas Detection and Environmental Monitoring

HETAS currently work closely with the Council of Gas Detection and Environmental Monitoring (CoGDEM) in ensuring continued safety in the operation and use of all solid fuel burning appliances. Further information and support on CO alarm requirements can be obtained from the HETAS technical helpline on 01684 278194 or by contacting the CoGDEM CO helpline on 0800 1694 457.

Best Practice and Compliant Locations
Where a CO Alarm Can Be Located



LEGEND

1. Wall mounted alarm **not** within 150mm of ceiling
2. 1 metre minimum horizontal distance from appliance
3. Ceiling mounted alarm **not** within 300mm of wall
4. 3 metre maximum horizontal distance from appliance

N.B. If there is a need to wall-mount an alarm above a door or window it must be located as high as possible

If the alarm is in a room with a sloping ceiling, it should be located towards the highest side of the room.

Always locate the alarm in the same room as the appliance.