

## HSE Safety Alert - Risks from redundant solid fuel back boilers

### 1 Who is affected?

HSE is issuing this safety alert for the attention of individual homeowners, tenants, landlords and the plumbing/heating industry. This is to raise awareness of the potential dangers of lighting a solid fuel fire when a redundant solid fuel back boiler has been left within the fireplace.

### 2 What is the risk?

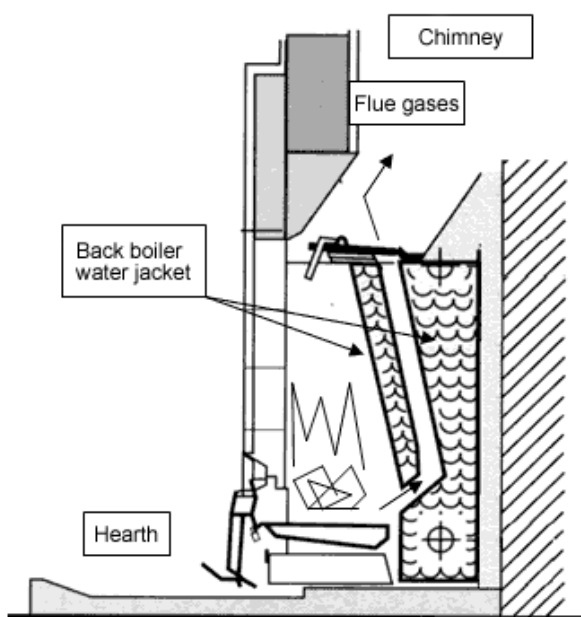
The alert follows several incidents in the last five years, three of which resulted in serious injury, and sadly in one case, a fatality. The redundant solid fuel back boiler had been left in a sealed condition and sometime later, when a coal or wood fire was lit in front of the boiler, the unit heated up sufficiently for the internal pressure to cause the boiler casing to explode.

### 3 Where can the risk arise?

Situations to consider will include where a solid fuel back boiler has been drained down over winter in vacant premises, or where it may have been left in place after conversion of the property's heating system - often to a gas or oil fired system with a new remote central heating boiler. Due to the disruption of removing a back boiler from the fireplace they may have been left in place for the decorative effect of the fire-grate, or covered by a panel or other feature.

### 4 What causes the problem?

The back boiler unit typically consists of a fire grate, which carries the combustible material e.g. coal, and a water chamber 'surrounding' it. This water 'jacket' is generally behind the fire but may also be at the sides and partially above the grate with the flue passing through it. Thus heat input to the water is gained from the hot flue gases as well as radiated from the 'coals'. As the units are difficult to drain completely there is likely to be residual water in the redundant boiler which will turn to steam when heated. This exacerbates the pressurisation if the unit was left in a sealed condition.



In one 'explosion' case a fire had been set, in the grate in front of the boiler on an early autumn evening to warm a lounge; in another, the panel cover had been removed to bring the fire back into use to heat the lounge and reduce the use of the oil fired central heating. In each case it was the first time a fire had been lit since the 'conversion'.

In tests carried out in 2002 it was found that the top and sides of a solid fuel back boiler, without circulating water, reached temperatures in excess of 700°C. Within 2 hours the temperature in some areas had reached around 480°C. This compared with normal system maximum operating temperatures of 124°C.

## 5 Industry recommended action to control the risk

Previous advice recommended that a redundant back boiler left in situ must be in a condition such that an unsafe level of pressure cannot build up in the unit. Thus, at the decommissioning stage the system should have been drained and redundant pipework removed along with, ideally, the back boiler itself. If not removed the boiler should have been left in a 'vented' or 'open' condition. If the pipe connections were plugged, at least one 6mm diameter hole should have been drilled in the water jacket, preferably in a vertical or near vertical face. In some cases the decommissioning may have been carried out by an individual, or heating or building organisations that were unaware of the potential problem, or had not seen the advice.

Other longer term potential dangers can arise with continued use of a fireplace and redundant back boiler even if appropriately vented:

1. If connected pipework is left in situ, corrosion/cracking of the water jacket sidewalls may allow flue gases to enter the pipework and be conveyed to other areas of the property with potentially dangerous consequences. The high temperature of the pipework may also present a fire risk.
2. Continued use of an open fire has potential for structural damage through repeated expansion and contraction of the boiler casing, which is significant due to the high temperatures involved.

**Additional note: the flue of a retro-fitted gas fire must not pass through the redundant water jacket.**

HETAS, the independent UK body recognised by DEFRA for the official testing and approval of domestic solid fuels and solid fuel burning appliances, advises:

*The only positively safe and reliable way to proceed, when a solid fuel back boiler is no longer needed and the customer wants to continue using the fireplace, is to totally remove the back boiler installation by breaking up the chamber that used to carry the hot water system and removing any pipe work. When an open fire is left in use (or could be brought back into use) a replacement Milner fire back needs to be installed to ensure that the fire can be safely used.*

*Similarly, a "wet" solid fuel room heater or stove with boiler should not be operated after the water supply to the boiler has been disconnected. These appliances are not designed to be used without water circulation and there could be serious safety issues if they are misused.*

## 6 Information for homeowners, tenants, landlords and heating professionals

The information in this safety alert will help you decide whether you need to address a potential safety risk within your property or housing stock. Key control measures are either to ensure permanent protection from open fire and heat sources, or to refrain from lighting fires until appropriate protection and venting is provided or the unit is removed.

### Homeowners

If you believe you have a redundant back boiler in the circumstances mentioned above you should NOT light a fire in the fireplace until you have sought professional advice\*.

## **Tenants**

If you are unsure or believe you could have a redundant back boiler in the circumstances mentioned above you should contact your landlord urgently. In the meantime you should NOT light a fire in the fireplace.

## **Landlords**

(a) You will need to assess your stock and identify those houses containing a redundant solid fuel boiler so as to determine an appropriate plan of action in consultation with a competent person\*

(b) In the meantime you should issue instructions to relevant tenants advising of the dangers and to NOT light a fire in the fireplace until further notice.

## **Plumbing/Heating Professionals**

You may wish to note the industry recommended guidance in this alert and from your professional bodies.

\* Contact the Solid Fuel Association helpline - 0845 6014406 or consult the websites: [www.solidfuel.co.uk](http://www.solidfuel.co.uk) or [www.hetas.co.uk](http://www.hetas.co.uk).