

### Passive fire protection in buildings – why is it important?

Everyone is familiar with a fire alarm and what it does. It is a form of Active Fire Protection. And thankfully, people are also now increasingly, understanding why by law they need to carry out a Fire Risk Assessment on a building for which they are responsible. But it is still easy for the uninitiated to miss vital factors that will save lives in a fire, and help compartmentalise and control the spread of the fire.

If a fire starts anywhere in a building – such as in a hotel, the first thing that should alert everyone is the fire alarm – this is vital because many fires start at night, when people are asleep. The carbon monoxide fumes from an undetected fire can kill sleepers before they ever awake. Most fire victims suffocate from hot poisonous smoke long before the flames reach them. But once the fire has started, and the people are all aware, there are several vital factors that will affect whether they survive or not.

**Emergency lighting** First, do the emergency lights work? The fire will quickly burn through PVC electricity cable. Properly, well-maintained emergency lights should operate for three hours on their internal batteries and light the escape routes.

**Escape routes**, secondly, are the escape routes identified as such and planned for? Are they clearly marked? Kept clear?

**Protection of escape routes** And thirdly, vitally, are escape routes protected from fire and smoke? If they are partitioned with fire resistant walls and doors, which are closed in a fire, they will give a corridor of escape, or place of refuge until rescued.

But that won't work if the red hot, poisonous smoke is travelling at high velocity in the walls and under floors, and through the roof, only to meet you with secondary fires when you get halfway out. Paper famously catches fire at 451 degrees Fahrenheit – that's 232 degrees C. The smoke and fumes from fires reach 500 degrees C in minutes and can easily reach over 1000 C. This means the superheated, high pressure smoke will find its way like water through the tiniest of voids and cracks, and ignite anything inflammable in its path. Victims will be surrounded by lethal smoke and asphyxiate in minutes, even though they thought the fire was behind them.

All this means that, once alerted to a fire, the safe evacuation of people and the control of the spread of the fire in a building with cracks and small holes through walls, ceilings and floors, is seriously jeopardised. These factors are considered so important now that new buildings have to undergo room pressure tests, to check that there are no leaks for smoke to get through. People can die from fire fumes in areas in buildings remote from the fire where the fire never reaches, and where they thought they had found safe refuge.

### Structural integrity and its effect on fire spread

So in a building, we need to ensure that the structure will hold up the progress of the fire and smoke – it's called compartmentalisation. Walls and ceilings are usually gypsum plasterboard, which is fire resistant: but the fire will melt the pvc light switches into burning liquid in minutes and if the sockets in a stud wall are not lined with fire resistant material, the fire will go straight through into the internal wall voids and travel to anywhere there is a route. Doors onto the escape route should be one-hour fire rated. PVC pipes passing through fire resistant partition walls, will rapidly melt, burn and funnel fire and smoke through to anywhere along their length. The same is true of cables passing through even solid walls. If the hot smoke finds these it will ignite them, and the flames will have free reign to move through to the other side and spread the fire. Smoke travels upwards through vertical shafts and spaces at a rapid rate, so these should be sealable – hence the annoying fire door at the bottom and top of stairs, and fire dampers in ventilation shafts. Fire escapes should be protected. It's no good trying to use a fire escape when the fire is raging out of a window onto the escape landing people are trying to use. If you have workmen in to carry out alterations, they can easily breach your fire protection and any fire will certainly find those holes. If the holes are above a ceiling and you don't see them, you could be in trouble if a fire breaks out.

**Approved Document B Volume 2 - Buildings other than dwelling houses**, of the Building Regulations covers the structural issues relating to inbuilt fire protection in buildings. This involves not just an early warning detection system, but compartmentalisation of the building to protect escape routes and prevent the fire from travelling through the building.



A fire will spread easily and quickly through holes and gaps like these left by workmen and builders. Such oversight is very common indeed. **A fire will spread through a hole the size of a pencil in four minutes.**

### So what can be done to thwart the fire and fumes from spreading?

This must be part of your fire risk assessment procedures. At the first visit, our assessor is looking not only for proper fire early warning, and good means of escape, but also for ways in which the fire can spread, and ways it is or is not, compartmentalised. Assessment of adequate passive fire protection forms part of our fire risk assessment.

There is a variety of strategies and materials now available that will compartmentalise a fire and slow it down or stop it. Most are easy to install, and all are cheaper than the consequences of a fire. The important thing with all of these is that they are fitted by trained installers. Badly or incorrectly fitted "fire stopping" as it is sometimes known, is a wasted expense as it will not perform. The wrong materials in the wrong place will be worse than useless as they will give a false sense of security that might slow up people's response to the fire alarm.



Intumescent collar for fitting round pipe through wall. The collar is lined with a fireproof material that expands in response to heat and blocks the hole by crushing the plastic pipe and expanding into the gap

There are many other specialist materials and boarding to block the path of a fire and protect structures from burning or collapsing from heat, as steel will do if not covered, once it reaches 500° C. A properly fire stopped building will save lives in the event of a serious fire, and may well save most of the building too.

**Our staff are trained by world leaders Hilti in passive fire protection materials and their correct installation. If you would like us to come and look at your passive fire protection or have any questions, just make a phone call. 01326 373896**