

PENETRATIONS IN FIRE RATED WALLS

and other construction elements

What is the hazard?

Open penetrations in fire rated walls are a common hazard found in most occupancies. Despite their often insignificant appearance, there is the potential risk of fire and smoke spreading through the penetration, from one fire section to the next. Fires can also spread vertically and therefore the sealing of penetrations through floor and ceiling constructions is of particular importance. The fire sealing method mentioned in this document is also known as fire stopping.

Even if the wall is not rated as a fire wall, sealing penetration(s) will still prove to be beneficial, by providing intact separation and avoiding the risk of damage caused by smoke spreading.



The penetration of fire rated walls and floors is often necessary to accommodate electricity, data cables and piping systems. Penetrations by ventilation systems are discussed in a separate hazard information sheet. The maintenance of proper fire sections is not only a very important step towards ensuring effective fire-fighting but it is also a way of ensuring that people can evacuate the building safely.

Fire rated walls will be unable to provide protection against the spread of smoke and heat if there are unsealed penetrations. Fire or smoke will be able to spread through an open penetration, which will result in more extensive damage to property and in particular damage to vulnerable goods or, in the worst case scenario, a total loss of the entire building.



Picture shows an example of unsealed penetrations through a fire rated wall.

HOW TO REDUCE THE RISK

Maintaining the integrity of fire rated walls is essential for fire sections to work as intended in the event of a fire. Therefore, all penetrations must be properly sealed to ensure effective fire resistance. The sealing of vertical penetrations through fire separating constructions are especially important due to the chimney effect and must be carried out in the same way as for wall penetrations.

The following initiatives should be implemented in order to reduce the risk of a fire spreading:

- Site plans should be up to date, correctly indicating the position of fire rated walls. A maintenance register listing fire rated walls and all penetrations through them gives a good overview to manage penetrations. A permit to work system can also be employed before penetrations are made.
- Sealing of penetrations should be included as a separate task in all projects and included in the day-to-day maintenance routine. The work should not be regarded as completed until the quality of the seals has been verified. During ongoing works, openings through fire rated walls should be temporarily sealed with e.g. heat-expanding sacks.
- The sealed penetration should have the same fire rating as the surrounding construction and must take into account, amongst other parameters, the cable diameter as well as the thickness of the wall. Verify with the installer that the solution is appropriate for the situation before work is started.

- Penetrations through fire rated separations should only be sealed by an approved contractor using approved sealing products. If own employees are going to seal the penetrations they must undergo appropriate training.
- The sealed penetration should be provided with a sticker indicating the date when the seal was made, the fire resistance rating and the name of the company making the seal.
- We recommend selecting a single preferred sealing material for all of the penetrations at the site, rather than allowing many different materials to be used. Sealing solutions based upon using combustible materials should be avoided.
- Penetrations have, on occasion, been filled with mineral wool, which is not an acceptable sealing method. Likewise, bags should only be used as a temporary solution e.g. during projects. In such cases there is a risk that the ignition of a smoke layer in the room during a fire will create a pressure wave of sufficient force to displace the seal and open the penetration.
- Cable trays should not pass through a fire rated wall because the metal tray can conduct heat through the wall and may ignite materials on the other side. However, if the cable tray does pass through a fire separation, then the tray must be protected with an intumescent coating for a sufficient distance on both sides of the wall.

AN EXAMPLE of a cable penetration, which has been properly sealed using the correct sealing materials, before and after it has been exposed to a fire.



AN EXAMPLE of the temporary sealing of a penetration using heat-expanding sacks, before and after it has been exposed to a fire.



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