3.0 Passive fire protection

This guidance highlights how passive fire protection can be used to limit the spread of fire and reduce damage.

RISK ADVICE LINE

Having read this guidance should you have any additional questions on this topic or other risk related matters, as a valued Ecclesiastical customer you can contact us through our 'Risk Advice Line' on 0345 600 7531 (Monday to Friday 9am - 5pm, excluding bank holidays) and one of our in-house risk professionals will be able to assist. Alternatively you can email us at **risk.advice@ecclesiastical.com** and one of our experts will call you back within 24 hours.

For queries about your policy cover or claims please contact your insurance broker.

Heritage buildings can be extremely vulnerable to fire due to a number of factors including the use of traditional, often combustible materials, in construction, undivided roof spaces, hidden voids and other openings

Passive fire protection is an integral component of structural fire protection and fire safety in a building. Passive fire protection attempts to control fire spread by the inclusion of compartments of fire resisting walls, floors and doors limiting building damage and providing means for the buildings occupants to escape.

Active fire protection are those measures that operate only after a fire has started e.g. automatic fire detection, automatic sprinkler or suppression systems. Please refer to our separate guidance note on this matter.

UK Building Regulations detail the legal requirements for new buildings and extensions and the focus is on life safety or means of escape. The Regulations cannot be retrospectively applied and their standards may be inadequate to protect the building and the ongoing operation of the organisation. Additional measures over and above those required by the Regulations should therefore be considered.

Passive fire protection should be promoted as positive conservation to help protect the building and its contents. This intervention in the historic fabric of a building must balance with building conservation.

It is important that existing and future passive protections form part of your overall fire safety strategy along with any active fire protection at your premises.

Fire compartmentation

Compartmentation is usually achieved by the vertical or horizontal division of the building into separate fire compartments using approved fire resisting materials e.g. fire resistant floors, walls and other divisions that offer resilience to the potential impact of a fire.

Benefits of fire compartmentation include the following:

- Resists the effects of fire for a given period of time normally a minimum of 60 minutes without the intervention of fire fighters or fire suppression systems. This reduces the chance of a fire spreading and helps firefighters extinguish the fire.
- Helps to protect building occupiers and support effective means of escape by slowing the spread of fire, heat and smoke.
- Minimises damage by fire and smoke to historic building features, contents and unique assets.
- Reduces the potential for structural collapse of a building.
- Reduces the risk of spread to higher risk areas e.g. plant rooms or fuel stores.
- Enables more time to implement salvage and recovery plans.

If an area is being considered for compartmentation with barrier materials, expert advice needs to be obtained.

In heritage buildings, as with other buildings the main elements to consider when contemplating fire compartmentation include the following:

- Walls
- Floors
- Doors
- Glazing
- Voids.

Walls

In many heritage buildings internal walls are constructed of bricks or stone that can provide robust fire resistance. It may be possible for a wall with minimal openings to form a compartment.

Floors

The most common floor construction type in heritage buildings is timber which of course is combustible. Ideally the spread of fire vertically between floors would be prevented. Any designated compartment floor must maintain the structural fire resistance, fire integrity and insulation of the floor for a specified period.

There are a number of ways to upgrade the fire resistance of floors in historic buildings and a specialist should be asked for advice on this matter.

Doors

Close attention needs to be made to doors in any fire compartment wall, with suitable fire resisting doors and frames selected. Doors should be fitted with door closers, smoke seals to resist the passage of smoke and intumescent seals that swell/seal gaps when exposed to hot fire gases. Door closing devices prevent doors from being wedged open rendering them ineffective in a fire event.

If doors are not closed or shut this will compromise the performance of any fire compartment wall. Any doors installed within fire compartmentation walls must have a fire resistance grading the same as the fire compartment wall.

Heritage doors can be quite substantial and may resist fire for some time with no specialist material present. This cannot, however be relied upon. Whilst there is an array of products such as intumescent varnishes and seals, advice should be obtained from a specialist with experience in dealing with fire resistance in heritage buildings to understand the most appropriate interventions.

Glazing

Glazing may be a weakness in a fire compartment. During a fire glass can melt at intense temperatures. Any repairs to glazing must be correctly undertaken to ensure fire resistance is maintained. Specialist fire rated glass is available but may not be compatible with the heritage nature of the building.

High level windows opening into a roof space should be fitted with fire rated glass, if at all possible, to prevent fire spreading throughout the roof.

Voids

It is important to understand the locations of any voids and cavities to help prevent fire spreading. Often their location or even existence, is not known.

Original plans of the building may highlight where they can be found. A void can form a hidden route for fire, heat and other combustion products to follow.

Voids may have been created for functional reasons e.g. ducts for services, shafts for lifts, dry risers or an indirect consequence of construction e.g. behind plaster walls or timber panelling.

Sealing a void may be a possible solution but they may provide internal ventilation at the property to reduce the risk of damp and rot occurring. It may be appropriate to install fire dampers (to prevent fire spreading inside the void) linked to an automatic fire detection and alarm system.

Roof Spaces

Some heritage buildings will have significant undivided roof spaces. Timber roof frames, ceiling finishes and dust accumulations can increase the potential for rapid fire spread. Fire barriers can help prevent heat and smoke spreading at high level from one roof area to another. The barrier may be a rigid partition or curtain and is fixed from the ceiling finish below to the apex of the roof space. The barrier should provide at least 60 minutes fire resistance. Any doors in these barriers must be suitably installed and protected to prevent the spread of fire.

Smoke curtains aim to help prevent heat and smoke spreading at high level from one area to another. They may be rigid barriers or a heat resistant material fixed to the ceiling or roof apex. They can be located permanently into position or manually or automatically operated.

Metalwork

Steel or wrought iron frames may have been added into historic buildings as a structural component to replace combustible timber. Steel buckles at low temperatures in fire conditions and loses mechanical integrity. Methods to protect metal structures include encasing with fire resisting coatings e.g. intumescent materials or other materials e.g. fireproof board and concrete or mortar.

Fire Stopping

Fire compartmentation can be breached or compromised by holes being made in walls, ceilings or floors to allow the routing of cables, utilities, ventilation systems or other mechanical devices. Often, these penetrations are not correctly fire stopped after the work has been carried out. Such fire stopping should form part of any work which breaches the fire compartment and should be inspected immediately after the work is undertaken.

The fire resistance of the fire stopping products used must be consistent with that of the fire compartmentation. These products include fire resistant ductwork and enclosures, intumescent pillows, fire resistant sealants and mortars. Data regarding their performance in a standard fire test should be available.

Your fire risk assessment should include the identification and sealing of any pre-existing breaches to help protect the property.

Installation

Only third party certificated products should be used and installers must be appropriately accredited.

Maintenance

Bespoke plans/records should be retained showing the location of fire compartment works to be used for reference and for recording future changes.

A documented maintenance programme should be in place. This should include a regular visual inspection of the compartmentation works and an annual audit by a fire consultant. Any breaches identified should be urgently rectified.

Key messages

- It is important to regularly review the impact of fire on people, property and your business.
- Fire compartmentation may help in reducing the effects of fire, smoke and heat should a fire event occur.
- The creation and maintenance of fire compartmentation should play an important part in your fire strategy.
- Passive fire protection should be considered in your fire safety strategy in conjunction with active fire protection measures.

Important Note – For any interventions to your building you will require Listed Building Consent (if a listed building). Also, you should consider any advice given by Historic England, the Amenity Societies and other conservation bodies.

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