

## Sandwich Panels

### Understanding the Risk

Sandwich panels (composite panels) consist of an insulation material core, of varying thickness, held between metal or plastic facings. They have been used extensively in external wall and roof construction for many years. They have also been used within buildings to form internal structures.

The main reasons for their popularity are:

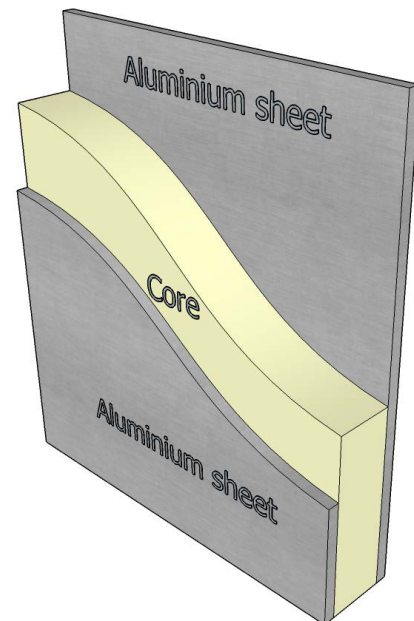
- Good thermal insulating properties reducing heat and cold transmission
- Acoustic properties reducing sound transmission
- Lightweight
- Ease and speed of construction
- Ease of wash down - essential in certain industries
- Relative low cost when compared to some other forms of construction

These factors can reduce both construction and ongoing energy costs. However, the fire risks associated with some types of sandwich panels should be fully understood.

The insulation core within sandwich panels varies. The core material used generally falls into one of the following categories:

- Non-combustible mineral wool or fiberglass
- Polyisocyanurate Foam (PIR)
- Polyurethane Foam (PUR)
- Expanded or Extruded Polystyrene (EPS and EXPS)

Some of the insulation core materials listed above are combustible. For the purpose of this document these will be referred to as Foam Insulated Sandwich Panels (FISP).



Some manufacturers have produced sandwich panels that have been subject to independent fire testing and approval. This may not mean they are 'non-combustible' but does demonstrate an improved fire performance.

There have been numerous serious fires over the years, where FISP panels have been used in construction, resulting in significant loss of facilities and resultant business interruption consequences. The main detracting features of using a combustible or non-approved sandwich panels are as follows:

- Potential rapid fire spread within the panel
- Difficulty in fighting fires where the concealed core is involved
- Melting polystyrene core creating a spreading burning liquid fire
- Delamination of panels can occur exposing combustible core to direct fire impingement increasing the rate of fire spread
- Liberation of dense corrosive and toxic smoke

Due to the nature of fires involving combustible core sandwich panels (particularly EPS/XPS), the efforts by public Fire Brigades may only be limited to life safety operations and defensive fire fighting to prevent spread to adjacent properties.

Additionally, even a relatively small contained incident could result in considerable smoke contamination and collateral damage to buildings, contents, stock, machinery and equipment with a high financial loss and disruption to the activity undertaken at the facility.

### Controlling the Hazard

In order to effectively control the fire hazard associated with sandwich panels it is necessary to have in place an effective combination of both human element and physical protection controls.

Human Element controls relate to the management procedures aimed at reducing the likelihood of a fire occurring and ensuring an effective response in the event of a fire.

Physical Protection controls relate to protection or design principles aimed at reducing or mitigating the effect in the event of a fire.

The issues detailed under these 2 headings should be considered fully, to create an integrated risk control program.




### Human Element

- Ensure management loss prevention programs where sandwich panels present are robustly followed i.e. good housekeeping, self-inspection, smoking regulations, emergency organization.
- Identify and label all combustible core sandwich panels and regularly inspect for damage exposing the core. Where the core is exposed, it should be repaired promptly.
- Conduct infrared thermography inspections of electrical installations. Any deficiencies identified should be rectified.
- Ensure combustibles and flammable liquids are not stored near panels.
- Implement an appropriate Permit to Work procedure whenever work is undertaken on or in the vicinity of sandwich panels.

### Physical Element

- Avoid the use of combustible core sandwich panels. Where this cannot be avoided, only use panels that have undergone an appropriate test and approval.
- Panels should be firmly fixed to the building frame in accordance with the manufacturer's installation guidance to mitigate early delamination of the metal facing in a fire incident.
- Where combustible core panels are already present, replacement should be considered at the earliest opportunity.

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- Penetrations through the panel should be avoided but where they are necessary, cables or services that pass through should be contained within a non-combustible housing and opening sealed with fire-stopping materials.
  - Hazardous operations within the premises such as cooking should be contained within a fire-compartmented area with a minimum 1-hour fire resistance, including self-closing doors.
  - Chimney or flue vents should not be directed through or located close to combustible panels. Where this cannot be avoided, 15cm of non-combustible insulation should be provided around the flue.
  - All repairs to panels should be conducted as soon as discovered using fire retardant materials.
  - Impact skirting or crash barriers should be installed to mitigate physical damage.
  - Direct mounting of machinery and equipment, especially electrical should be prohibited.

In view of the many different panels that are readily available, you should contact your RMC Engineer for approval prior to purchasing.

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