

# SANDWICH PANELS

ALLIANZ RISK CONSULTING



Building with Insulated Metal Sandwich Panel Walls (Source: Kingspan)

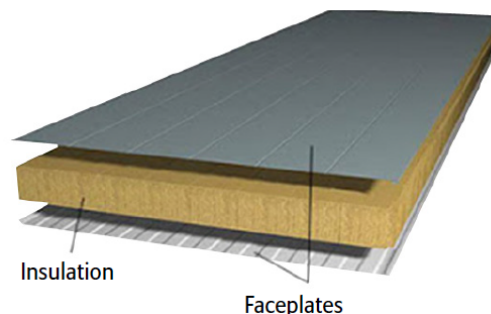
This Tech Talk discusses types of sandwich panels, potential fire hazards and Allianz Risk Consulting (ARC) recommendations for new and existing installations.

## AT-A-GLANCE

- Sandwich panels are commonly used because of their excellent insulating properties and ease of installation
- Sandwich panels with combustible insulation have been involved in a number of serious fire losses
- Sandwich panels with non-combustible insulation are always preferred
- Clients should contact Allianz Risk Consulting before installing sandwich panels to ensure that proper materials are selected

## INTRODUCTION

Sandwich panels used in building construction are generally an insulating material assembled between two thin facings.



Typical Sandwich Panel

The insulation used between the facings can be sourced from a variety of materials:

- Rock fiber/mineral wool/stone wool/rock wool (noncombustible)
- Glass wool/fiberglass (noncombustible)
- Modified phenolic foam (combustible)
- Polyisocyanurate (PIR) (combustible)
- Polyurethane (PUR) (combustible)
- Expanded polystyrene (EPS) (combustible)
- Extruded polystyrene (XPS) (combustible)

The facings, or faceplates, are typically made of metal (steel or aluminum) or plastic (PVC or fiberglass reinforced plastic).

Sandwich panels, or insulated metal panels, are commonly used in the construction of walls, ceilings and roofs as a result of their excellent qualities:

- Superior thermal insulation characteristics
- Ability to withstand harsh conditions (moisture, low temperatures, etc.)
- Ease of cleaning
- Low weight
- Good mechanical resistance to wind and building loads
- Ease of installation

Used extensively in the food, pharmaceutical and semiconductor industries, sandwich panels can also be found in many other industries.

Sandwich panels with combustible insulation have been involved in a number of serious fire losses globally. It is very difficult for firefighters to extinguish a fire involving sandwich panels containing a combustible core. These fires often result in a total loss of the building.

## FIRE HAZARD

When combustible insulation is used, fire can spread inside the panels themselves, where water from sprinklers or hose streams cannot reach. Automatic sprinklers designed to protect the occupancy of a building, typically cannot control fires involving walls and ceilings constructed of combustible sandwich panels that are not listed or approved by a nationally recognized testing laboratory.

In addition, when plastic insulation burns, considerable quantities of toxic, dense black smoke are generated, which can contaminate a large area. Even small fires can cause considerable damage in occupancies susceptible to smoke contamination. Moreover, the acidic products of combustion can corrode electronic equipment.

For these reasons, sandwich panels containing noncombustible insulation are always preferred.

## ARC RECOMMENDATIONS

The following basic loss prevention recommendations, while not all inclusive, can reduce the potential for property damage and resulting business interruption caused by sandwich panel fires:

**1. Use sandwich panels with non-combustible insulation** (e.g., rock fiber/mineral wool/stone wool/rock wool/glass wool/fiberglass, etc.), such as panels with a Euroclass A1 or A2 rating. This is particularly important with occupancies sensitive to smoke contamination like data centers, food processing facilities, semiconductor fabrication factories, pharmaceutical plants, etc. When sandwich panels with combustible insulation are required for technical reasons, they should be listed or approved in any of the following third-party certification categories:

- a. FM Approved Class 1 (Class Numbers 4880, 4881 and 4882)
- b. LPCB (Loss Prevention Certification Board) Approved

Please contact ARC before the installation of any sandwich panels to ensure the proper materials are selected.

**2. Provide adequate automatic sprinkler protection** for areas with combustible sandwich panels, especially if they are not listed or approved as indicated above. In rare cases, an adequately installed thermal barrier over the sandwich panels is an acceptable alternative to sprinkler protection. Please contact ARC for detailed recommendations regarding protection for unlisted/unapproved sandwich panels.

**3. Ensure the sandwich panel facings are in direct contact with the insulation** in order to prevent delamination. This can be achieved by providing through-fasteners and by attaching the panels to the support frame in accordance with the manufacturer's recommendations.

**4. Ensure the entire panel assembly is installed by approved contractors** in strict accordance with the manufacturer's instructions. Special attention should be given to properly sealing all side, top and bottom edges and making sure there is no exposed combustible insulation.

**5. Avoid penetrations** in sandwich panels with combustible insulation in order to ensure the integrity of the panel and to avoid exposing the insulation. If the panel must be penetrated, the following precautions should be taken:

- a. The penetrating hole should be drilled cleanly and the gap filled with a non-combustible thermal insulation material compatible with the element penetrating the panel. The penetrating pipe or conduit should be noncombustible.

- b. For fluids heated above 100°C (212°F), provide a non-combustible thermal insulation collar at least 2 cm (3/4 in.) thick around the pipe to ensure the temperature of the combustible insulation is kept below 80°C (175°F).
  - c. Electrical cables should be placed in metal conduit and escutcheon plates should be provided on both sides of the wall. The facings and the insulation should not be in contact with the cables.
- 6. Identify and promptly repair all impact damage to sandwich panels** in accordance with the manufacturer's guidelines. Mechanical damage to sandwich panels due to impact by pallets or forklift trucks may expose the combustible insulation to a potential fire.
- 7. Provide adequate separation between heat producing equipment** (e.g., ovens, furnaces, battery chargers, HVAC units, electrical equipment, lighting equipment, etc.) and sandwich panels with combustible insulation. Table 1 can be used as a guide.

Equipment Power Input (kW)	Min. Distance between Equipment & Sandwich Panel
≤ 2	0.2 m (8 in.)
2 to 50	0.8 m (2.6 ft.)
50 to 200	1.5 m (5 ft.)
>200	2.5 m (8.2 ft.)

**Table 1** (Source: APSAD D14-A)

- 8. Maintain effective human element programs** in buildings where combustible sandwich panels are installed. In particular, the following human element programs should be implemented:
- a. Hot Work – Prohibit hot work inside or within 11 m (35 ft.) of buildings with combustible sandwich panels. If hot work cannot be avoided, ARC's Hot Work Management program (or equivalent) should be strictly followed, including providing a fire watch and adequate shielding of the panels using approved fire blankets or fire screens.

- b. Smoking – Prohibit smoking inside or within 11 m (35 ft.) of buildings with combustible sandwich panels.
- c. Housekeeping – Maintain good housekeeping in buildings with combustible sandwich panels. Particular attention should be paid to the storage of combustibles in close proximity to the sandwich panels.
- d. Thermographic Inspections – Conduct thermographic inspections of critical electrical equipment annually. These inspections should be carried out by qualified personnel and deficiencies should be promptly corrected.

## REFERENCES

APSAD D14-A, Sandwich panels and fire behavior

## QUESTIONS OR COMMENTS?

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**Tech Talk** is a technical document developed by ARC to assist our clients in property loss prevention. ARC has an extensive global network of more than 100 property risk engineers that offers tailor made, customer focused risk engineering solutions.

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