

5 Identifying Insulated Panels External

5.1 Identifying Insulated Panels for Fire Risk Assessment

Sections 2 and 3 of this Guide illustrate how panels are used in modern constructions and indicate how they are likely to perform in fire.

In order to carry out a Fire Risk Assessment and assess whether the Insulated Panel will contribute as a source of fuel it is necessary to determine three points:

- Is the construction an Insulated Panel
- What is the insulating core material
- How are the panels fixed

There are a number of potential sources of information available to assist in the identification of the cladding system and to confirm that the construction is an Insulated Panels and not a site assembled or built-on-site system.

CDM health and safety file

For buildings built after 1995/6 the primary source of information should be the Construction Design and Management [CDM] Health and Safety File. This file should contain the as-built specification of the materials used in the building and copies of the manufacturer's literature. It will also identify whether the panel is LPCB/FM certificated. Copies of the file should be retained by the Building Owner. Copies will also be retained for some time by the Architect and the Planning Supervisor.

In cases where the building was built before the introduction of CDM or the H&S File is not available, other sources of information are:

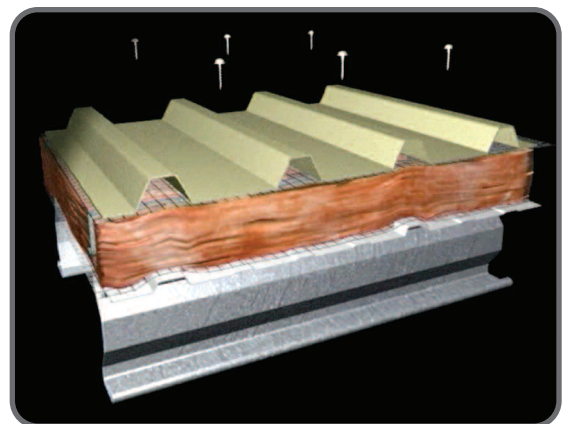
- The architect/designer, or Design and Build company
- The construction company
- The cladding contractor for the project
- The building owner or property company's records.

5.2 Identifying Insulated Panels – the building envelope

Site assembled cladding systems

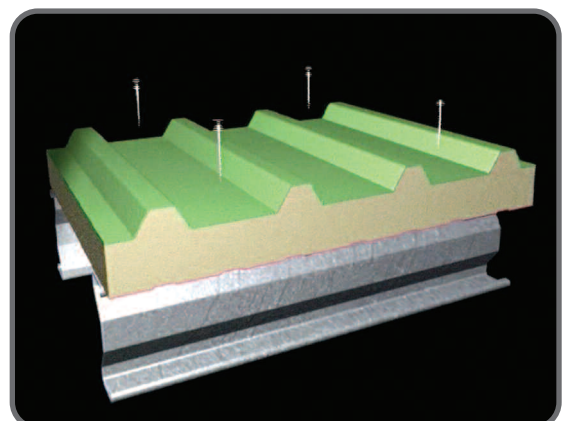
Metal clad industrial and commercial buildings built prior to the mid 1980's were mainly constructed using a site assembled cladding systems for the external roofs and walls. These consisted of:

- a. A profiled metal external weather sheet
- b. A glass fibre quilt type insulation
- c. A lining system usually comprising plasterboard in 'T'-bars, or occasionally a flat faced metal lining sheet



Introduction of Insulated Panels from 1980

Insulated Panels, delivered to site as a single piece component and incorporating a polyurethane [PUR] insulating core, started to be used in greater quantities from 1980, accounting for 10% of the market by 1990, 40% by the end of the 1990's and over 60% by 2006.

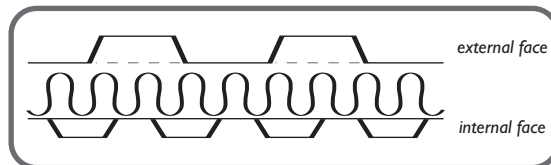


Is it a panel or a site assembled system?

The shape of the external profile can provide a valuable clue to the type of cladding system.

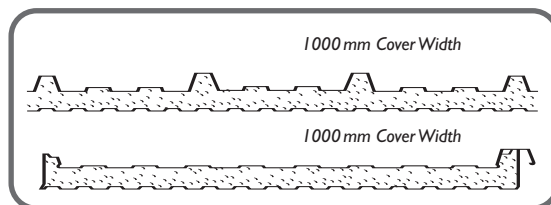
Deep profiles

If the external facing is a regular deep profile typically 35-40 mm, it is most likely to be a site assembled system with a glass or mineral fibre quilt insulation. A hollow sound when tapping the crown of the profile should indicate this type of system. This type of system is found on roofs, and walls of older buildings.



Site assembled system profile

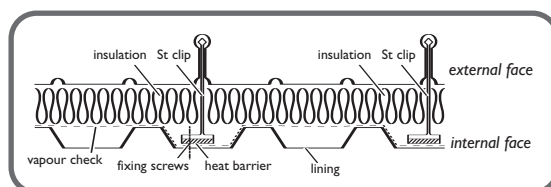
If the external face has an irregular profile with longer distance between crowns then the cladding is most likely to be an Insulated Panel. These panels are found on both roofs and walls of buildings.



Insulated panel profile

Standing seam profiles

Roof systems where the external sheet has a narrow raised rolled seam at the joints is most likely to be a site assembled 'standing seam system' with MF quilt insulation. However a small amount of insulated panels with standing seam joints have been used since 1998. To confirm if it is a panel, check for firmness and solidity of the roof system and also whether the internal facing has a micro-box profile.



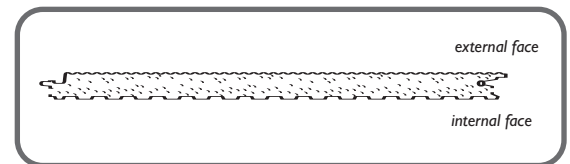
Typical standing seam roofing built-up system with quilt insulation

Roofs without easy access

Where roof access is not easily possible to identify the cladding system, inspecting the internal lining can provide valuable clues. The internal facing of an insulated panel will be relatively flat with a mini-box profile. The corresponding metal liner sheet for site-assembled systems will have a profiled liner approximately 20 mm or slightly deeper.

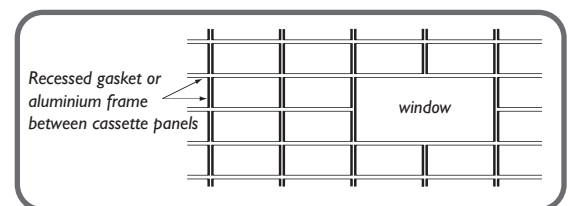
Micro-rib profiles

Wall claddings that run vertically from ground or short wall to eaves and which have a micro-rib or flat profile will be an Insulated Panel System. Similarly cladding running in a horizontal format between columns will be Insulated Panels. (See also cassette panels below).



Cassette systems

Wall cladding systems that are a multiplicity of small panels i.e. 2.5 x 1.2 m tightly supported in a support frame or grid are likely to be panels. However the type of insulation should be carefully checked as some panel types were manufactured with polystyrene cores.



Typical cassette panel arrangements often with polystyrene insulation.

Curves

Curved roofs where the radius is quite noticeable are most likely to be constructed using the standing seam system. Curved roofs with a very shallow curve with or without a standing seam joint system could be constructed from Insulated Panels. The end of the panel/cladding at the eaves or gutter should be checked to confirm the type of system that has been used.

A general summary guide is shown in Diagrams 1 and 2.

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Profile identification summary

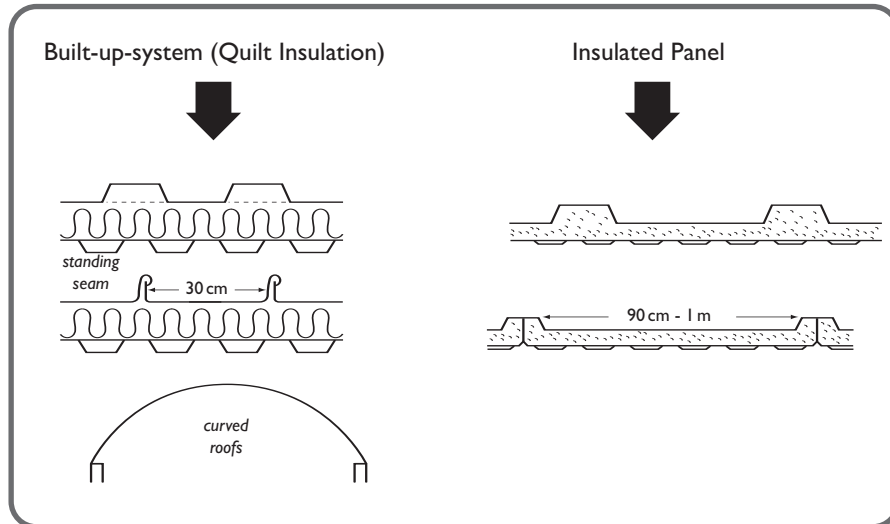


Diagram 1. Roofs – identification by profile shape

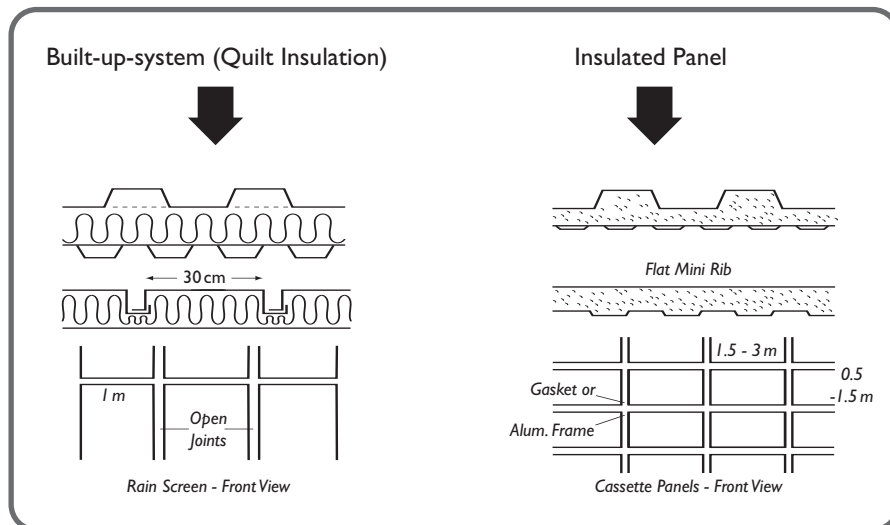


Diagram 2. Walls – identification by profile shape

Fixings

The majority of Insulated Panel systems and all site assembled systems use through fixings that secure both external and internal facings to the building structure. This prevents collapse of the panels in fire and allows the metal facings to remain in place and provide a degree of protection to the insulating core.

Some external wall Insulated Panel systems are designed with an engineered interlocking joint that combines hidden (non-visible) fixings and a separate interlocking fixing plate. These systems are also effective in retaining the facings during the developing stages of a fire.

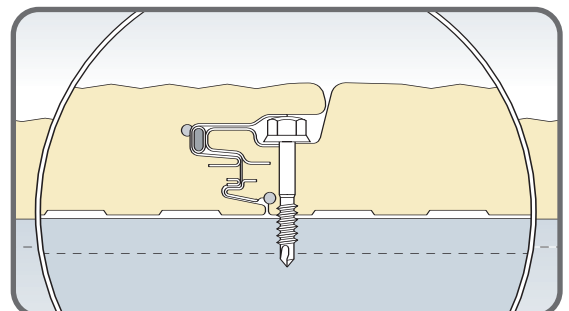


Illustration of a secret fix joint

Identifying Insulated Panels Internal

5.3 Identifying Insulated Panels and other systems – Internal

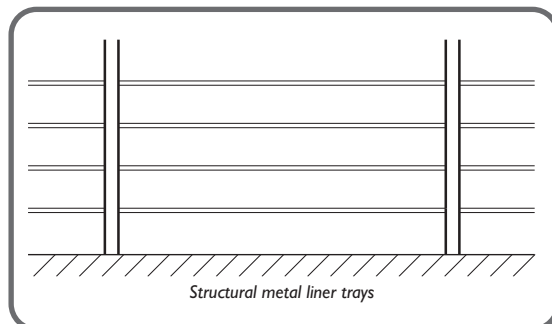
Internal walls and ceilings

Insulated panels are frequently used to create environmentally enclosed spaces within buildings. These are illustrated in section 2.3. The panels have micro-box or flat facings and will be of varying thickness according to the temperature i.e. ambient activities, chilled storage etc.

The type of panel and the insulating core can only be determined by inspection at an end or cut section – see Section 5.4.

Metal liner sheets or tray systems

Where metal linings or claddings are used, for most constructions tapping the liner will determine if it is a solid insulated panel or a hollow built-up system. It should be noted that some thick structural linings have been used in sports halls etc where the incidence of damage is high. These liner sheets are generally mounted horizontally and may not exhibit a hollow sound.

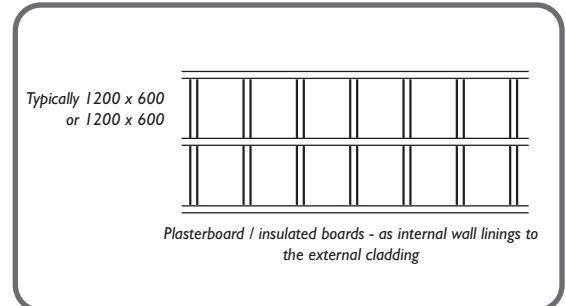


Structural metal liner trays.

Other internal wall lining systems

Over the years a variety of wall lining systems that should not be confused with panels have been used, particularly in industrial and warehouse applications.

Most 15-20+ year old buildings have non metallic linings. These are typically made from plasterboard sheets in 'T-bars' as part of a built-on-site system.



Plasterboard/insulated boards as internal wall linings to the external cladding.

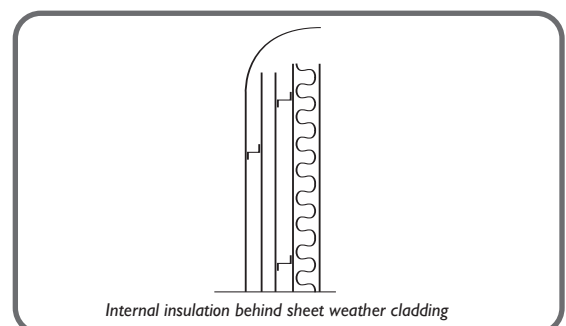
Alternatively many older buildings have been retrofitted with faced insulation boards where the internal joint has been sealed with a tape. The facing of some boards is made of aluminium foil.

In fire the thin aluminium foil facings and similar do not offer protection from fire and the T-bars do not retain the boards. Fire can therefore break through behind the wall lining and involve the insulation or spread unseen in the cavity behind the system. If there is a probability of this happening then this should be taken into account in the fire risk assessment.

Two foil-faced board systems have LPCB certification and an improved fire performance. These boards can be identified by checking for glass fibres that are visible within the PIR core.

Lined-out buildings

Some buildings are constructed of a basic shell with roof and wall cladding that acts as a weather sheet and which has been lined out with panels. In most of the buildings the panel core will be polystyrene. As with lining boards above, this form of construction creates a potential hidden chimney behind the wall lining allowing an internal fire to spread unnoticed.



Internal insulation behind sheet weather cladding

5 Identifying Insulated Panels

Core insulation

5.4 Fire risk assessments

The earlier sections of this Guide have emphasised the importance of determining the type of core insulation as part of the Fire Safety Assessment.

The first stage should be to check whether the type of core material is recorded in the records (5.1). If no record is available a visual check is the only alternative.

There are some other helpful guidelines. The use and distribution of various types of Insulated Panels and their respective core insulant is described in Tables 1 and 2. PIR/PUR core insulation has exclusively been used for insulated roof panels. The only task therefore is to determine that the roof is an Insulated Panel system and not a site assembled system.

PIR/PUR is the main core material used for wall panels. MW is used for external wall panels and very occasionally PS has been used for some infill panels. In internal applications all core materials have been used. It is therefore necessary to visually check the core to identify the type of insulation used in wall panels.

Checking for LPC/FM certificated panels with PIR insulation

- Check CDM and other records (see section 5.1)
- Check the longitudinal edge of the panels, if accessible – some manufacturers use a printed identification tape
- Check for a UV identification code printed on the internal face by some manufacturers

Checking the core insulation

It is sometimes possible to find a small exposed area at the top or end of a panel or wall section. The core can also be exposed by unscrewing/ removing a short section of flashing at a corner, reveal, or edge detail. It is not recommended to cut holes in the facing of a panel.

Identifying the type of insulation

Mineral fibre (MF) and glass fibre

Site assembled systems use a quilt form of this insulation. It is of low density, spongy and very similar to loft insulation.

In Insulated Panels a high density form of MF with the fibres running perpendicular to the panel facings is used. This core material is quite distinctive and obviously fibrous in nature.

Polystyrene (PS)

Well known and recognisable from its use as a packaging material.

Polyurethane (PUR) and polyisocyanurate (PIR)

If not MF or PS the core is most likely to be PUR or PIR, which is used in the majority of Insulated Panels.

It is not possible to visually distinguish between PUR and PIR⁽²⁾. The majority of panels installed before 2000 will be PUR cored.

PIR (LPCB certificated systems)

Some PIR (LPCB certificated panel systems) were manufactured before 2000. From 2000 the urethane panel manufacturers steadily changed production and from 2005 all UK produced external panels and most internal panels were manufactured as PIR (LPCB certificated systems). External claddings that are LPCB approved to LPS 1181 can be regarded as satisfying the original grade 2 construction rules or be classed as a non-combustible building. (Note: This does not imply that the material is non-combustible)

Phenolic (PF)

It is difficult to distinguish between PF, PUR and PIR. PF is denser and more friable but the only sure differentiation is by laboratory test⁽²⁾.

NOTE 1.

An indication of the fire performance of PUR and LPC PIR panels is given in Section 3. PIR (LPCB certificated systems) (2) has an improved performance but for external applications of panel it should not normally be necessary to distinguish the type of rigid urethane for Fire Risk Assessment. Similarly for internal applications with low fire load or low fire risk it should not be necessary to determine the exact type of urethane. The need for precise identification will be as required by the Fire Risk Assessment.

NOTE 2.

Panel systems certificated by Factory Mutual (FM). A number of projects have been built using PIR panels tested and certificated by FM. These panel systems are very similar in formulation and design to the PIR (LPCB certificated systems) panels and have a similar fire performance but with different fixing requirements. These panels have primarily been used on buildings constructed for American Corporations where American Insurance is involved. FM panel systems should be identifiable from the project records.

⁽²⁾ It is possible using laboratory tests to identify whether the core is likely to be PIR or PUR (few panels manufactured before 2000 will be PIR). Panels with Loss Prevention Council LPCB or Factory Mutual FM certification will have a PIR core. Similar tests can identify phenolic (PF) core material.