

Application of Bondor™ Insulated Panel Systems in

CLEAN ROOM



A Clean Room corridor in a pharmaceutical company

To ensure the sanitation and hygiene needed inside a clean room are easily maintained, food processing facilities, electronic and pharmaceutical industries can benefit from using Bondor™ Insulated Panel Systems in order to get a room that is:

- able to ensure and preserve cleanliness and healthiness,
- easy to maintain,
- able to preserve certain temperature to prevent materials damage inside the room,
- capable to sustain air cleanliness, and
- able to **ideally fulfill the requirement of current good manufacturing practices (cGMP/ CPOB - Cara Pembuatan Obat yang Baik)** as required by the National Agency of Drug and Food Control (BPOM - Badan Pengawas Obat dan Makanan).

Many pharmaceutical companies use Bondor™ Insulated Panel Systems to comply with **ISO 5 (Class 100 for most aseptic areas), ISO 7 (Class 10,000 for surrounding areas) and ISO 8 (Class 100,000 for support areas)** as defined by **ISO 14644-1 Clean Rooms and Associated Controlled Environments Part 1: Classification of Air Cleanliness**, the worldwide standard for classifying the cleanliness of the air in clean rooms and clean zones.

Advantages of using Bondor™ Insulated Panel Systems in Clean Rooms

As a superior quality product, the application of Bondor™ Insulated Panel Systems in Clean Rooms has many advantages such as:

Slip Joint®

- The Slip Joint® system applied in Bondor™ panels has the ability to increase the strength and the bonding of the panels, which results in an increased capability as a vapour barrier.
- The use of Slip Joint® shortened panel installation time, reduced noise pollution, and decreased the usage of support structure.

Choices of Panel Cores

Fire-retardant materials are designed to burn slowly, in contrast to fire-resistant materials, which are designed not to burn at all.

Fire-Retardant Cores

- *Self-extinguished Expanded Polystyrene (EPS)* with density of 15kg/m³ and 50 or 75 mm thickness are usually used for clean rooms.
- *Polyurethane (PU)* with density of 38-40kg/m³ is more popular to be used in commercial cold rooms between 4-36 m².

Fire-Resistant Cores

- *Mineral Wool Fibreboard (Flameguard™)* is classed as non-combustible with an excellent fire performance and has a melting point above 1000°C.
- *Polyisocyanurate (PIR)* can significantly reduce the serious risk of property damage and loss of business due to fire.



The Slip Joint® system used in EPS and PU Panels.
Patent Reg. No. ID 0 010 442 - D



Four types of panels in Bondor™ Insulated Panel Systems:
(1) EPS Panel, (2) PU Panel,
(3) PIR Panel, (4) Flameguard™ Panel

No rivet exposure for Clean Room applications

Steel Skin

- 0.6 mm thick Food Grade pre-painted steel with a modified polyester/acrylic paint finish is used to make a strong and firm structure.
- For superior life span against rusting and to make it maintenance free for life, the steel skins use weathering corrosion proof Galvanized Steel.
- Especially for clean room or food processing applications, the panel surface will be a plain structure with no profile.

Wall to Ceiling / Floor Joints

- The connection between wall panels, ceilings, and floors in a clean room will use radius coving with 35 or 65mm diameter, or 90° angle and PVC/Polyacetal 3-way corners to meet the clean room's requirements for cleanliness and hygiene.
- All extrusions are made from off-white powder-coated Aluminum to make it aesthetically match the steel skin color.

Doors

- Made with 50 or 75 mm panels and anti-corrosive component extrusions.
- Available in many different types: either manual or electrical, from single or double swing, horizontal or vertical, to airtight doors with interlock systems.
- All doors are designed for heavy-duty usage and are easy to operate and maintain.
- In airtight doors, such as the ones used to go from public to production areas or grey to white areas, a P-setter will be used inside-out to prevent air from getting through to make sure the air quality and conditions wanted inside the room are sustained.

Windows and Door Viewing

- Choices for extrusions used in windows and door viewing in clean rooms are rounded or 45° shaped.
- Clear, tampered, or laminated single, double, or triple glass is available.
- Single glass is usually used in processing rooms, while double or triple glass is used in clean rooms to make sure there is a flat surface between windows/viewing and the panels.
- To prevent fungi growth and condensation, inside a triple glass there is dry air, while in a double glass window, a silica gel system is used.

Other Clean Room Attributes

- Lamp frames, man holes, and air supply ducts inside a clean room will use the same extrusion used in windows and door viewings.
- Return air wall flashings made from folded 0.6 mm Food Grade off-white steel skin will be used.

Fast, Easy, Clean Installation

Bondor™ Insulated Panel Systems with Slip Joint® provide a fast assembly and a shorter construction time.

The advantages of using Bondor™ Insulated Panel Systems from a construction point of view are:

- panels are manufactured according to each customer's needs and order based on the building structure,
- during installation, panels can be adjusted according to the building structure,
- easy adjustment using the same panels if customers would like to change the design of the room,
- **no rivets are exposed in doors or windows for clean room application,**
- all gaps between extrusion panels and glass will be sealed with sealant to structurally strengthen support structure,
- flexible during earthquakes,
- able to be used for high-rise buildings,
- easy to transport and install,
- small construction load, starting at 12 kg/m³ depending on the type of insulation material used, which results in
- lower construction costs.



Recess surface windows and viewings



Pass Box from inside a Clean Room. Inset: from outside



Door's drop-down bottom seal to prevent air transfer



Auto-hinged swing doors with Interlock Systems between white & grey areas



Return Air Grill in the corner



Inbow lamps specially designed for clean room