Mudahjuta Industries Sdn Bhd
147668-U

ISO 9001:2000

Acoustic Treatment and Rain Noise Reduction for

Metal Deck Roofs

Insulation Solution for Thermal, Transmission Loss & Rain Drumming

Designing Efficient Building Systems – IBS

An Essential Design Consideration for All Architects, Engineers, Building Consultants and Contractors.

Cogent* System Solutions

** Registered Trademark of MISB*

Prescribed System Solutions For

- **Acoustic Performance**
- **Thermal & Energy Savings**
- **Passive Fire Protection**

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Designing with Cogent* Panels

Cogent Panels are available in standard proprietary models serving common requirements as demanded by projects in general.

For individual project performance features, various modifications may be made to suit specific project requirements with differing combination of specifications, selective enhancement in type of insulation performance, preferred priority of properties and yet provide a proprietary solution which is easy to work with on site.

Design Checklist
For the Preparation of Cogent* Panels

- Acoustic Performance
- Thermal Performance
- Fire Insulation & Integrity
- Weight of Materials
- Size and Compatibility
- Ease of Construction
- Weather Resistance
- Durability
- Cost

Insulation Specialists
Acoustic Fire Thermal

At Design Stages

MISB's technical team will be able to assist you and your project consultants in establishing suitable parameters for the project intended.

At Construction Stages

Some projects already have the design parameters established. If you submit them to our technical the specified values, MISB will be able to assist you in selection of models suitable providing your with maximum on site efficiency and optimising costs

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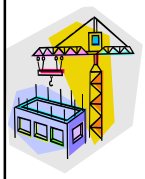
Current Roofing Problems Encountered

By rule of thumb, Transmission Sound Loss of a system is directly proportional to mass.

Therefore, conventional methods used in fulfilling this criteria often means very cumbersome construction. It is often based on multi layers combining numerous layers of heavy particle boards spaced apart using metal brackets to accommodate several layers of insulation blankets such as mineral wool or fibre glass laid in between. Such method is continuously complicated by unpredictable weather exposure while the workers laboriously install layer upon layer of materials which are not resistant to water.

To obtain higher STC values such designs would involve much higher structural loading.

- **Drying and wetting of materials require adjustment to seal gaps especially on higher specifications.**
- **Intensive site supervision to ensure each layer is installed correctly.**

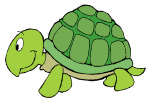


- **High level working is already dangerous without man handling cumbersome weight of materials.**
- **If installation is done correctly, material wastage will be high.**

- **Long hours of crane and labour activities required for individual material hoisting.**

- **Too many layers of installation and too may components involved.**
- **Intense exposure to sun causing boards to curl up at edges**
- **Insulation blanket soaked by rain**

- **Boards soften and crack by moisture**
- **Heavy materials difficult to handle at roof top coupled with slippery surfaces**



- **Labour intensive. Shortage of general workers**
- **Time consuming.**

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Design Considerations for Thermal Insulation

Thermal Insulation

Energy efficient buildings are becoming an essential criteria in all roof designs. About 30% to 40% average of energy loss is through the roof. In hot climates, air condition compressors have to work harder to maintain the room temperatures hence reducing durability. In cold weather, heat loss through the roof raises electrical/energy consumption significantly.

This property is normally specified in terms of Uvalue (W/m2K) which reflects a collective performance of individual layers working as an insulation system. Sometimes building consultants provides thermal conductivity *k* values (W/mK) and prescribes the thickness of a specific insulation material as a basis of referral.

Condensation Check

While consideration is given in fulfilling STC values, weather proofing, U values and Resistant R values, quite often the design will conclude with multi layers of materials each offering their individual performances to various parts of the specifications. During such adjustments, designs often neglect to consider condensation.

Tropical weather is humid and while the roof protects and confines air conditioned spaces, it creates differential variation of temperatures between the layers. When the weather changes and environmental conditions reaches dew point, water droplets may be found and mistaken as roof leaks.

Important to Evaluate

Cogent Panel solutions are designed for simplicity so as not to cause unpredictable thermal behaviours.

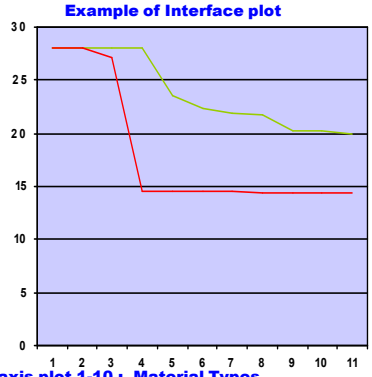
Incorrect positioning of vapour barrier will give rise to condensation build up where insulation blankets will sponge up the water.

If such condensation is allowed to build up over several months, premature problems such as corrosion will occur or deterioration caused by the presence of water affecting most building products in the long run.

Thermal bridging effects may cause condensation to form at the metal frameworks of ceiling and give rise to water stain patches which is quite often mistaken with roof leaks.

Cogent Panels will provide a JPA Designer check to BS 5250

Example of Interface plot



X axis plot 1-10 : Material Types
Y axis plot 0-30 : Temperature difference in between each layer of materials.

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Design Consideration for Acoustic Performance

Acoustic Properties

Acoustic performance values differ in accordance with the intended operations of the space below. Prescribed noise control by consultants ensures that roof performance is synchronised with the rest of the building to achieve internal room ambient noise levels suitable for the designated purpose.

a. Air borne noise or Transmission Loss

Often measured in terms of STC and/or Rw project specifications.

b. Rain drumming.

Normally referred to in terms of IIC and/or Ln and found in countries where tropical rain fall occurs.

c. Internal Room Absorption

Measured in NR/NC values. This requirement is maybe built into the roof system to avoid ceiling construction.

Acoustic Assessment +/- 3dB

Cogent Panels can also be assessed via Insul 6.2 Acoustic Software copyright of Marshall Day Acoustics. Data is applied from several years of international laboratory testing on various materials and components are used in the data bank to provide assessments during design stages.

Designing Cogent Panel Models

There are 2 popular standard product range available

- **Model HDRe39 used to form Rw 40 roof systems**
- **Model HDEr44 used to form Rw 44 roof systems**

Models can also be specially adapted and designed for individual projects as Cogent System Solution understands that building applications may differ on project basis.

Understanding Acoustics
www.dow.com/immotus/acoustics/index.htm
Hear The Difference of Treatment
www.dow.com/immotus/xmpl/sound.htm

A compilation of roof deck system with Cogent System Panels being tested for Transmission Loss STC Classification at UiTM laboratory in accordance with ISO 140/1

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All-in-One Panels

Manufactured In Malaysia
ISO 9001: 2000

ONE FIX installation

- **Acoustic + Thermal + Rain Drumming**
- **Light weight for handling each module.**
- **Packed, sealed and ready to be hoisted to working position.**
- **Reduction of Thickness**
- **Prefabricated modules for quality consistency**
- **Prefabricated to reduce labour intensity on site**
- **Class 'O' Fire Rated Modules**
- **Material combination selected to withstand weather during installation.**

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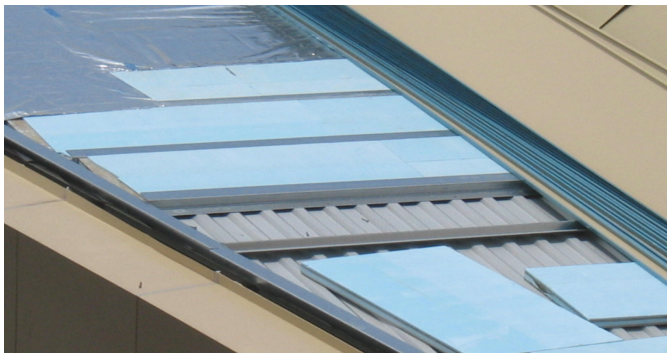
Module Pre-fabricated Panels

See Photos

- **Easy to Handle at Rooftops**
- **Compatible with metal deck roofs and accessories.**
- **Quality consistency as modules are pre-fabricated.**
- **All insulation requirements packed into a single module.**
- **Module weight designed for manual handling**
- **All panels are sealed without insulation fibre causing skin irritations.**
- **Modules are stable and not affected by unexpected rainfall or weather exposure.**
- **Various roofers have claimed that system speeds up their installation time by at least 50%.**
- **Wastage reduction**
- **Safer working environment on roof tops.**



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Delivery to Site

All Cogent Panels are delivered packed in shrink wrap plastic protective sheets and stacked on pallets.

For export orders

Cogent panels are packed in shrink wrap plastic, strapped and stacked on pallets to ease unloading at destination. Pallet are arranged into 40ft containers ready for shipping at Port Klang.

For Local Projects

Cogent Panels to be delivered on pallets and are easily lifted unto the roof for stacking and easy distribution.

Panel Sizes

Correct panel sizing will exploit light weight working, speed up installation and eliminate intensive labour. It also ensures a suitable man handling weight of each panel during high level working.

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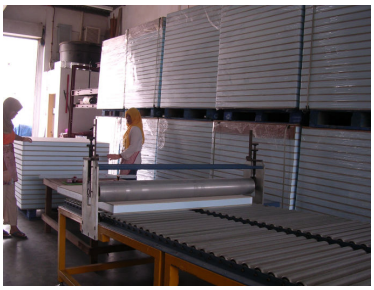
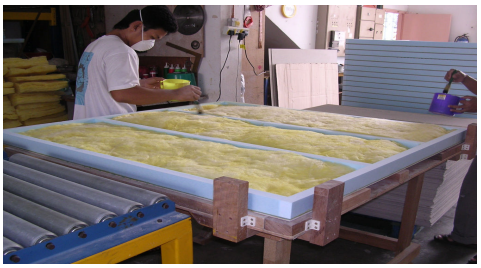
Fabrication and Components used in Cogent System Panels

Fabrication procedures shall be in accordance with ISO 9001:2000





Components used in the manufacturing and fabrication of Cogent System Solutions are selected very carefully balancing :

- **Durability**
- **Performance**
- **Stability against variations of weather**
- **Adaptability with other building components**
- **Costs**
- **Weight of Materials**
- **Material Strengths or Flexibility**

Exoskeleton

The external skin, known as the exoskeleton of the Cogent Panels, consist of a high density @ 1300kg/m3 fibre silicate cementitious board that are AUTOCLAVED to satisfy the most demanding exposure to weather conditions.

The composition of the material is 100% free of asbestos manufactured from a mixture of cement, organic fibres and selected mineral salts. Blended components as such gives rise to an exterior which has a superb dimensional stability making it very versatile in both, wet and dry conditions. It is moisture tolerant, fire resistant to AS 1530 Part 3 as well as BS 476 Part 6 & 7, resistant to industrial and atmospheric corrosion.

The superior stability of the exoskeleton crust will be able to contribute effectively towards a shield against weather ailments that are unpredictable during installation. If the situation demands added protection, each board is may be coated with a temporary acrylic layer which will remain effective temporarily or permanently whichever is required.

In the event where a roof leaks in future, Cogent Panels will simply dry out and restore its performance.

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Fabrication and Components used in Cogent System Panels……Continued

Internal Framework

EXTRUDED Polystyrene (XPS) Dow Styrofoam*LB is used for the internal framework and is necessary to allow the composite panels to span with minimum deflection of 1220mm supported at both ends. Styrofoam LB provides high insulation properties which will not allow heat to be conducted between the composite layers during contact. At the same time, Styrofoam LB display a compressive strength of 300kN/m2 spacing apart the dominant air gap without collapsing the air spaces in between.

While providing the internal rigidity as a framework around the Cogent System Panels, Styrofoam LB itself is does not absorb water, very light and does not adversely add to the working loads of a roof.

Fibrous and Non Fibrous Options

Cogent System Panels utilises a range of plastic technology products and specialised engineered components by The Dow Chemical Company to eliminate fibrous solutions with irritating concerns. Styrofoam* XPS, Ethafoam*, Quash* and Immotus* are amongst the insulating mediums often entered into a Cogent Solution.

For projects which require economical solutions, Cogent Panels will opt for fibrous insertions within the composites. However, wherever possible, the Cogent Panels will seal the sides of the finished panel to reduce the unpopular effects caused by fibrous insulation blankets during installation.

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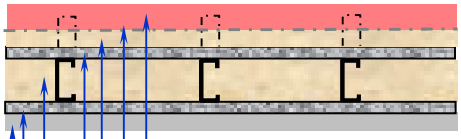
Comparing Conventional Multi Layers

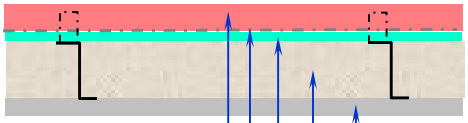
Normal Insulated Roof



- Top Deck Standing Seam System
- Aluminium Foil Vapour Barrier Vapour Barrier
- 25mm mineral wool @ 40kg/m3 density
- 12mm cement/wood chip particle board
- 50mm mineral wool @ 80kg/m3 density
- 12mm cement/wood chip particle board
- Bottom deck liner

EXAMPLE

Cogent Insulated Roof



- Top Deck Standing Seam System
- Aluminium Foil Vapour Barrier
- 6mm Ethafoam 222 Isolator
- 70mm Cogent Panel HDRe45
- Bottom deck liner

Comparison of Site Applications

• **Total Thickness of Insulation Layers**	**99mm**	**76mm**
• **No of Construction Operation**	**8 layers**	**5 Layers** Ethafoam may be laminated unto Cogent Panels
• **Spacer Distance**	**600mm centres**	**1200mm centres**
• **Est Weight of Insulation Materials with Spacers**	**45 kg/m2**	**25 kg/m2**
• **STC Rating of Insulation Layers Only**	**STC 45**	**STC 45**

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Technical Support

Cogent System Panels are constantly undergoing Research and Development to find better improved building solutions for the rapidly changing construction industry. Therefore, it is important to contact us to ensure that you have been provided with the OPTIMUM panel design to suit your application.

MISB is supported by technically by The Dow Chemical Company for insulation solutions and Promat for fire insulation solutions.

Call us for the Latest Price List and Models Available!

Insulation Specialists
Acoustic Fire Thermal

All Enquiries may be directed to

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Insulation System made with Styrofoam' for Residential Sector

Highway Barriers
For External Application

Cogent System Acoustic Doors

Ethafoam* Floor Isolators