

ModuSec

Secure and efficient IT room solutions

Composite Panel Systems Compared

Panel Systems are not all the same!

When it comes to accommodating critical IT systems, the first issue to look at is the environment in which they are placed and the level of protection afforded by the construction system chosen. Consider the consequences of losing these systems in a fire, flood or forced entry situation.



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Panel Systems Explained

Foamed panels

Some foamed panels produce a dense toxic smoke if the core is ignited, which can happen very quickly in a fire. They can add very significantly to the fire load (amount of combustible material) of a building, can cause dangerous flashover and generally provide low fire ratings. Hence they are totally unsuitable for IT environments

This is not the case for ModuSec's Pyrofoam core panels. They have International Maritime Organisation (IMO) approved smoke and toxicity levels, add no significant fire load to a building and provide a 90 minute BS476 Pt 22 fire rating.

Mineral Wool panels

Mineral wool is a fibrous material that is made from natural stone. It has very little inherent strength due to its fibrous nature.

Mineral wool composite panels are made by gluing blocks of compressed mineral wool between 2 sheets of steel 'skin'. This is generally a continuous factory line process with panels cut to required lengths. The level of insulation and fire protection is dependent on the thickness and density of the core material – which varies between manufacturers and/or products in manufacturers range.

Most mineral wool panels will have a BS476 Pt 22 fire rating (with rating period dependent on factors detailed above) with a critical 'pass' temperature of 180 degC. In addition, most will also have been tested to the LPS 1181-2 - reaction to fire test. Standard practice for this test is to have ceilings supported by the test rig. This is because the steel skins will expand at a different rate from the core under heat and hence will eventually separate from the core (delaminate). This is true of all steel faced composite panels. Unless the core has sufficient strength, the panel will lose its structural stability.

ModuSec panels

ModuSec panels have a phenolic foam core that is injected as a liquid into a mould that cools to form a single solid slab. Each panel is individually made to the required size and can include internal steel sections for extra strength, longer spans (up to 6m) and to hang heavy loads, cable conduits, steel mesh for higher attack security and joint profiles plus camlocks to increase joint strength and integrity. We also make preformed corner panels for quicker and easier construction.

Once cured, ModuSec panels are very light (around 20 Kg/m² for the standard panels), but incredibly strong. The compressive strength of the panels has been measured at almost 60,000 Kg/m² (60 Tonnes/sqm) before collapse. This means that they can be used as floor panels as well.

100mm thick ModuSec panels have a BS476 pt22 90 minute insulation and integrity test certificate and also meet the European EN1047-2 recommended limit temperatures for hardware protection for 75 minutes (measured at the protected face). We also opted to carry out the LPS 1181-2 enhanced test procedure with ceilings supported only by the walls – in order to demonstrate structural integrity of the walls in a fire situation. This is because the core material has a structural strength even without the steel skins (that will eventually delaminate - as discussed above).

Panel Systems Compared

Combustibility & Fire Load

Note that whilst mineral wool is classed as being 'non combustible', composite mineral wool panels do contain combustible materials (adhesives, surface materials, etc) and hence cannot be regarded as totally 'non combustible'. Pyrofoam cannot be classed as non combustible since it is an organic material. However, in testing by the Association of British Insurers, modified phenolic foam panels (Pyrofoam) are in the highest safety class for 'fire load' along side mineral wool.

Toxicity

Independent testing by Bodycote Warrington fire to International Maritime Organisation (IMO) standards (there is no UK standard) showed the levels of the key dangerous substances of carbon monoxide and hydrogen cyanide in Pyrofoam panels tested to be lower than that of a mineral wall panel test (according to manufacturers documentation) - under the same conditions (irradiance level 50kW/sqm).

Please see below a summary of these and other benefits of ModuSec panels with its modified phenolic foam (Pyrofoam) core:

ModuSec (Pyrofoam Core)	Mineral Wool Core Panels
Strength	
<p>Core material has high structural strength.</p> <p>A complete room structure has been successfully fire tested unsupported to the Enhanced LPS 1181-2 test procedure under increased burner temperature and time conditions. This demonstrates wall panels supporting ceiling panels without additional steel.</p> <p>Ceiling can span up to 6m without intermediate support with 'walk on' service access to BS6399. Also strong enough to be used as base panels to form a sealed six sided box.</p>	<p>Structural stability relies on the composite (steel covers and core). The core provides virtually no support on its own. LPS 1181-2 test uses support from the test rig.</p> <p>Wall panels are generally not recommended to support ceiling panels. Hence additional steel support is generally provided. This can increase cost and impede placement of M & E equipment if perimeter columns are required.</p>
Service Loads & Conduits	
<p>Steel reinforcement channels are foamed in to all ceiling panels to aid support of heavy hanging loads (pipes, cable trays, etc). Cable conduits or steel channels to hang heavy loads can be foamed in to walls as required. Light loads and conduits can be fixed anywhere to the steel skin.</p>	<p>No facility for placing internal cable conduits or reinforcement for heavier loads. Services are fixed to the surface skin and heavier loads supporting through the panels. This could increase heat transfer and has potential for water leaks if not properly sealed.</p>
Panel Connection	
<p>Mechanical camlocks with interlinked deep profile tongue and groove panels provides increased strength for fire suppression discharge or malicious attack. Also speeds up construction and makes extension/relocation easier.</p>	<p>Pushed together, generally fixed at top and base only with no intermediate fastenings.</p>

Panel Systems Compared

ModuSec

ModuSec (Pyrofoam Core)	Mineral Wool Core Panels
Porosity	
<p>Almost 100% closed cell core.</p> <p>Joints are sealed. However any water penetrating a joint will NOT affect the structural integrity of the panels.</p>	<p>Mineral wool is inherently porous. The level of porosity is dependent on the density.</p>
Insulation	
<p>U value (rate of heat transfer) of just 0.18.</p> <p>This will keep the 'Carbon Footprint' of the structure to a minimum.</p>	<p>U value of approx 0.38. i.e. half the insulation value of ModuSec with reduced protection from solar gain and environmental stability for air handling (AC) equipment with the same panel thickness.</p>
Fire Rating	
<p>100mm: F90 to BS476 pt 22. Meets hardware/media critical temperature criteria for 75 minutes.</p>	<p>100mm panels: F60 or F90 depending on density.</p>
Marine Fire Testing	
<p>Panels <i>and</i> cable/pipe entry system Lloyds IMO approved to 60 minutes. This tested multiple service entry points in close proximity for insulation and integrity.</p>	<p>Not known.</p>
Contamination on Drilling	
<p>When panels are drilled or cut, heavy particles mostly drop locally and are easily removed.</p>	<p>Light fibres tend to remain airborne for extended periods and can float off with the potential to contaminate hardware.</p>
Security	
<p>Tested LPS 1175 SR1-5 plus UK Government forced attack and blast</p>	<p>Not known</p>
Doors	
<p>Double rebated 65mm thick for additional insulation and security with 2 smoke seals all round. High security Class 3 doors available.</p>	<p>Normally 40mm thick with a single smoke seal.</p>
Overpressure Systems	
<p>Tested insulated overpressure and ventilation hatch options.</p>	<p>Standard 'off the shelf' units only.</p>
Manufacture & Installation	
<p>Single company manufactures to specific requirements and installs with a dedicated team of computer room/data centre shell structure specialists.</p>	<p>Generally manufactured and installed by different companies.</p>

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