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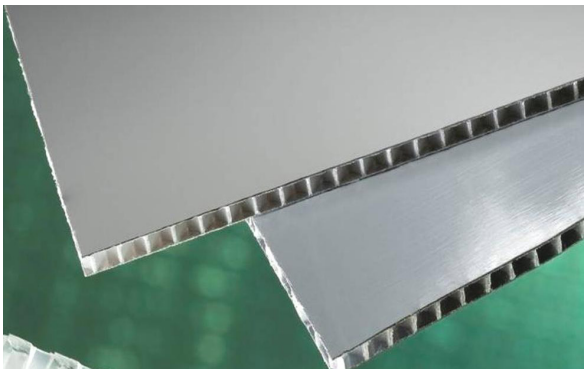
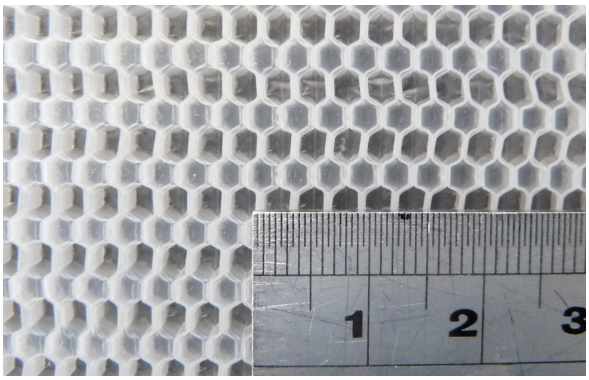
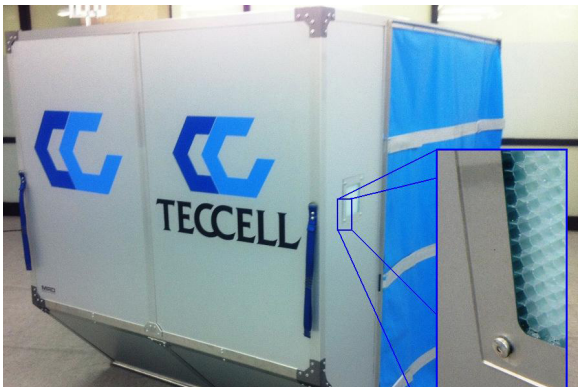
NEW GENERATION ALUMINIUM COMPOSITE PANELS







Picture above: Airfreight container produced by Gifu Plastics using EconCore technology.

After the successful global launch of ThermHex technology for packaging applications, EconCore intensively explores new material combinations, beyond mono-material sandwich panel concepts. The company introduces technology for cost efficient production of the next generation Aluminium Composite Panels.

More than 30 million tons of aluminium and its alloys are produced annually over the entire world to be consumed in many market segments, including packaging, building & construction, transportation, automotive and the most demanding industrial sector of aerospace. Constructors much appreciate relatively low weight of this material, ease of its processing compared to steel as well as its corrosion resistance.

EconCore's combination of thermoplastic ThermHex honeycomb core and aluminium skins brings panel weight to levels that were not possible today in mass aluminium panel production.

Due to ultra small size of honeycomb core cells, with cell diameters as small as 3 mm, a very smooth surface of the sandwich panel is achieved, even if the metal skin thickness is below 300µm.
The excellent aesthetics achieved with ThermHex Composite Panels opens up opportunities for use in visual communication boards and building facade panels.

Utilising the cutting-edge ThermHex technology, production cost of the panels can be reduced to a minimum. This is due to the continuous production process where a polymer film is extruded and directly converted into a honeycomb core. In a next step in the in-line process the aluminium skins are applied and bonded so that a sandwich panel is produced.

With the ThermHex technology weight savings are translated into cost savings as there are no off-line operations involved in the sandwich panel making process.

Applications include panels for visual communication, building facades, interior cladding, separation walls, solar energy modules, furniture and mass transportation interiors.

Key advantages:

- Made in highly efficient continuous process
- Reduced production costs vs sandwich panels made with traditional production process
- High flexural stiffness
- Low weight
- High aesthetics
- High thermal insulation capabilities
- Eco-friendly and recyclable

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The performance of different panels is compared by means of a three point bending simulation on the 3 different panels as listed below. In all cases a 10 Newton centrally distributed load is applied to the panels with a 1000 mm span length and 300 mm panel width.
The advantage of a sandwich panel over the solid aluminium sheet is obvious.

At virtually the same thickness the ThermHex Composite Panel has the same flexural stiffness as the traditional aluminium sandwich with solid polymer core, while the total weight of the ThermHex panel is reduced an additional 2.7 kg/m² or 56% !
In both cases the skins are 0.3 mm aluminium and the reduction is the result of the use of the ThermHex hexagonal honeycomb core, which is far more efficient than a traditional solid core.

*The 3.0 mm aluminium panel demonstrates high initial deflection due to high weight of the panel itself; mentioned value represents the incremental deflection.

Thermal insulation performance of the ThermHex panel with air entrapped in the honeycomb cells is extremely good and is much better compared to metals, glass or sandwich panels with solid polymer cores. This is due to the fact that the thermal conductivity of the solid PP core in the traditional panel is about 0.2 $wm^{-1}K^{-1}$ while a typical ThermHex PP honeycomb core has a thermal conductivity of approximately 0.07 $wm^{-1}K^{-1}$.

Product type	Aluminium and alloys	Glass	Traditional Aluminium Composite Panel with solid PP/PE core	ThermHex Composite Aluminium Panel
Thermal insulation performance	None, very poor	poor	good	excellent

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