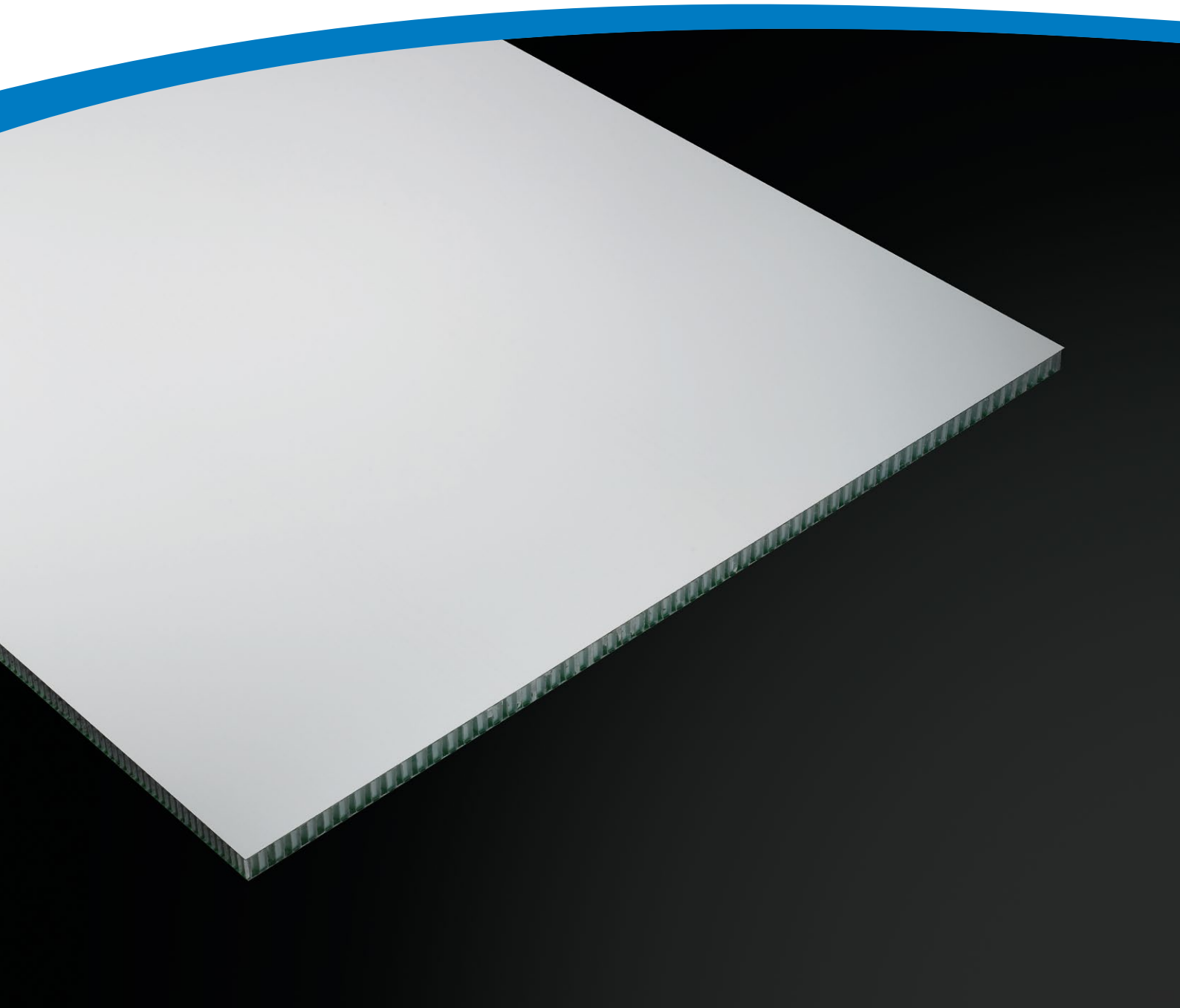
TATA STEEL

TATA

Coretinium®

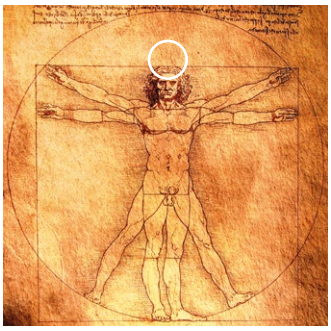
Lightweight composite sheets



Coretinium®

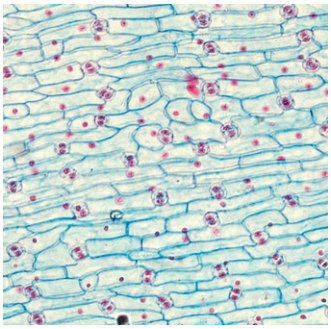
Impressive strength and rigidity

A composite sheet that takes its inspiration from nature's most optimised high performance materials.

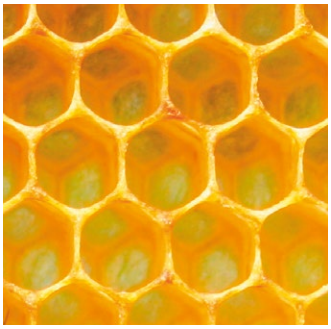


Section of human skull

Section of bird wing



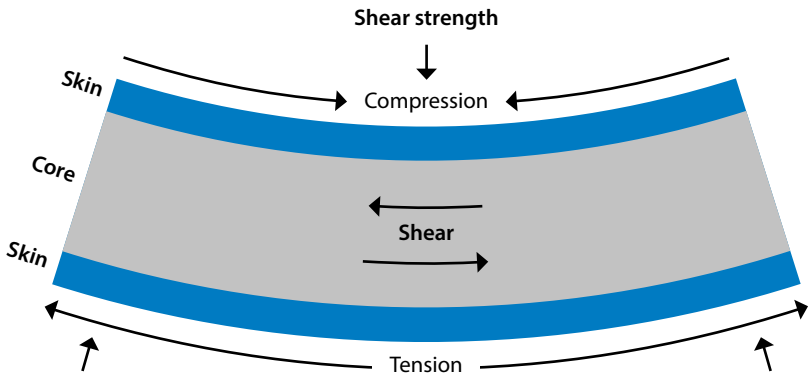
Section of iris leaf



Section of honeybee comb

Why composite materials work so well

As with the principles that make a steel I-beam so strong, it is the outside faces of a composite that does most of the work when the sheet is subject to bending, so separating these faces makes for efficient use of the material.



For a composite to be most effective:

- **The core** needs to have good compression resistance and shear strength.
- **The skin material** needs to have a high modulus and tensile strength.
- **The adhesive bond** of skin to core is critical for maintaining composite performance.

Composites: A sustainable choice

This efficient use of materials means less raw materials are needed to create high performance sheets.

Engineered to perform

A next generation composite sheet made using Econcore's patented continuous core production process combined with Tata Steel's Colorcoat® high performance pre-finished steel.

A high performance copolymer polypropylene core

Optimised geometry

The compressive characteristics of the hexagon shape make it one of the strongest structures in the world.

For a minimal density it maintains relatively high out-of-plane shear properties and unlike corrugated cores can resist bending in both directions.

Optimised production

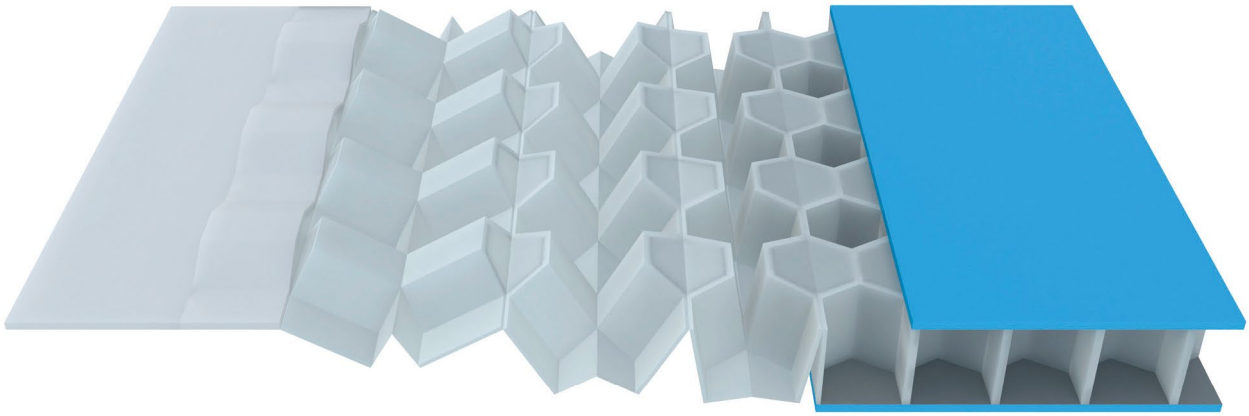
The Econcore process produces a honeycomb core that is economically viable and has a flat surface.

The flat core surface allows us to achieve a smooth surface aspect to the skin, and a high surface area to create a strong bond between the steel skins and core.

Optimised materials

Working with Total Petrochemicals, Tata Steel selected a copolymer polypropylene blend for the core that can maintain ductility at -40˚C.

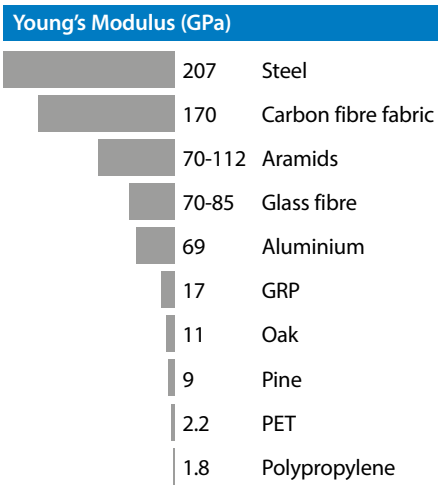
Engineered to provide greater rigidity, the core's mineral fill increases the shear modulus and compressive strength, helping the core maintain its form when subjected to continuous loads.



Combined with high performance pre-finished steel

The high strength of steel

The high Young's Modulus of steel makes it a very effective skin material compared to other options:



The other benefits of steel

Steel offers some significant benefits over other traditional skin materials:

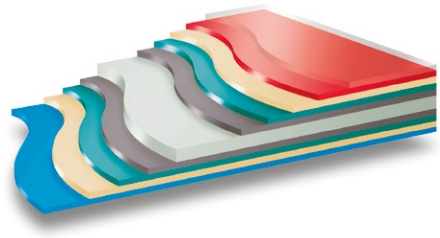
- Durable – UV resistant skin.
- Fire safe – A1 non-combustible.
- Resistant to creep.
- Magnetic.
- Easy to process on CNC.
- Easy to mechanically fix to.
- Strong stable surface for adhesive.
- Recyclable*.

* With typically 85% of product weight coming from the Coretinium® steel skins; at its end-of-life the composite sheet can be considered as steel scrap and recycled back into the steel making process without the need to separate the core from the skin.

Optimised materials

Colorcoat Prisma® pre-finished steel outer skins combine to provide enhanced aesthetics and long-term performance and durability.

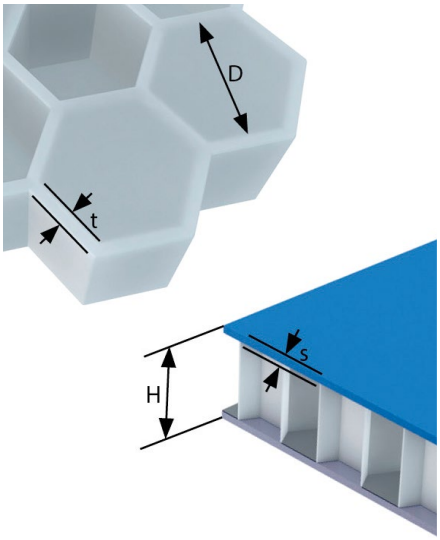
Colorcoat Prisma® pre-finished steel layers



- 15µm additional protection clear layer
- 25µm coloured layer with polyamide beads
- 25µm corrosion resistant primer
- Pre-treatment
- Galvalloy® metallic coating
- Base steel subtrate
- Galvalloy® metallic coating
- Pre-treatment
- 25µm corrosion resistant primer
- 10µm adhesive layer

Tailored to your needs

Coretinium® can be manufactured with a choice of height, skin thickness, cell diameter and wall thickness to optimise performance for individual application.



Coretinium® thickness		10mm		25/28mm	
Cell diameter		7mm		9.6mm	
Core wall thickness		400µm	600µm	400µm	600µm
Steel skin combinations	0.40/0.40mm	7.7kg/m²	8.3kg/m²	9.1kg/m²	10.4kg/m²
	0.55/0.40mm	8.9kg/m²	9.5kg/m²	10.2kg/m²	11.6kg/m²
	0.55/0.55mm	10.1kg/m²	10.7kg/m²	11.5kg/m²	12.8kg/m²
	0.675/0.40mm	9.9kg/m²	10.5kg/m²	11.2kg/m²	12.6kg/m²
	0.675/0.55mm	11.00kg/m²	11.7kg/m²	12.4kg/m²	13.8kg/m²
	0.675/0.675mm	12.00kg/m²	12.7kg/m²	13.4kg/m²	14.8kg/m²

- A higher density wall thickness of 600 microns will increase core strength and greatly improve compression and point load resistance.
- The thicker Coretinium® (25mm/28mm) products will offer greater flexural rigidity.
- Moving to a thicker steel skin will provide improved panel stiffness and pull out resistance for rivets.

Processing options

Coretinium® can be further processed though a range of techniques common to both the steel and composite industries.

Cutting to size

Forming

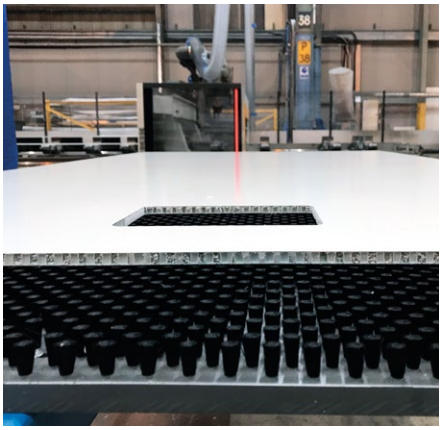
Fixing

A custom blanking service

Tata Steel has invested in a 5-axis pod and rail CNC machine located next to the Coretinium® line so that we can provide the ultimate in tailored custom blanks.

Capabilities include

- Cutting to size with +/- 0.5mm tolerances.
- Pre-drilling fixing holes.
- Cutting out compartments for inserts.
- Edge stripping the core to accommodate joining extrusions.
- Stripping steel and core to create fold lines.



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