

## THERMHEX PP SANDWICH PANELS

The ThermHex PP sandwich panel production is based on the patented ThermHex process. The process enables continuous in-line lamination of thermoplastic skins onto the honeycomb cores in a fully automatic production line.

By using our lightweight panel weight savings of over 80% are possible compared to a monolithic construction. In comparison to a monolithic organosheet laminate, a sandwich of the same stiffness requires fewer layers of composite, which means considerable cost and weight savings when using the ThermHex PP sandwich panel.

The panel consists of 0°/90° cross ply laminate skin layers (CP) made of continuous glass fiber reinforced polypropylene (GF/PP). The folded honeycomb core material consists of polypropylene as well. This allows an optimal bond between core and skin layers in the lamination process by thermoplastic welding.

The sandwich can be compressed locally to form a monolithic laminate which enables thermoforming of multi-curved shell structures and the formation of stable monolithic joining surfaces in one step. The pressed areas offer the possibility of functional integration by means of injection molding. Hence, complex lightweight parts can be produced very cost-efficiently in short cycle-times which is essential for many large-volume and automotive applications.

PP honeycomb sandwich panels are a lightweight and recyclable replacement of plywood and other conventional monolithic and sandwich panels. Applications include automotive parts, panelling in transportation, cargo boxes, bus floors, solar panels and many others.

### ADVANTAGES IN AUTOMOTIVE APPLICATIONS

HIGH WEIGHT-SPECIFIC STIFFNESS AND STRENGTH

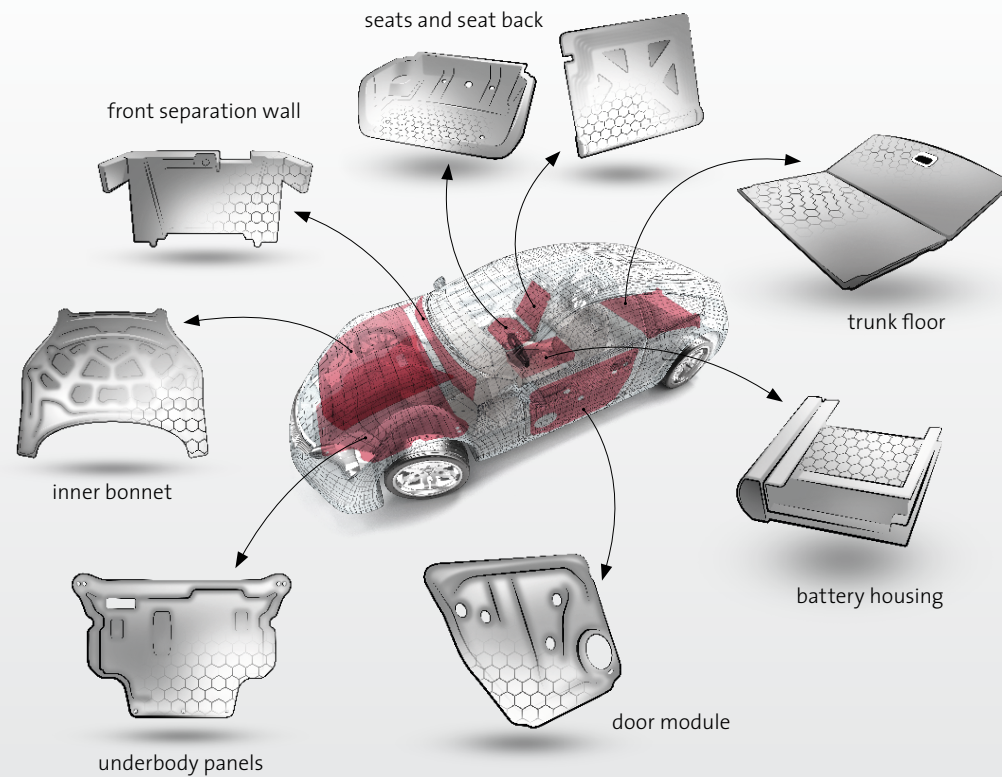
WEIGHT AND COST REDUCTIONS

REDUCED RAW MATERIAL USAGE

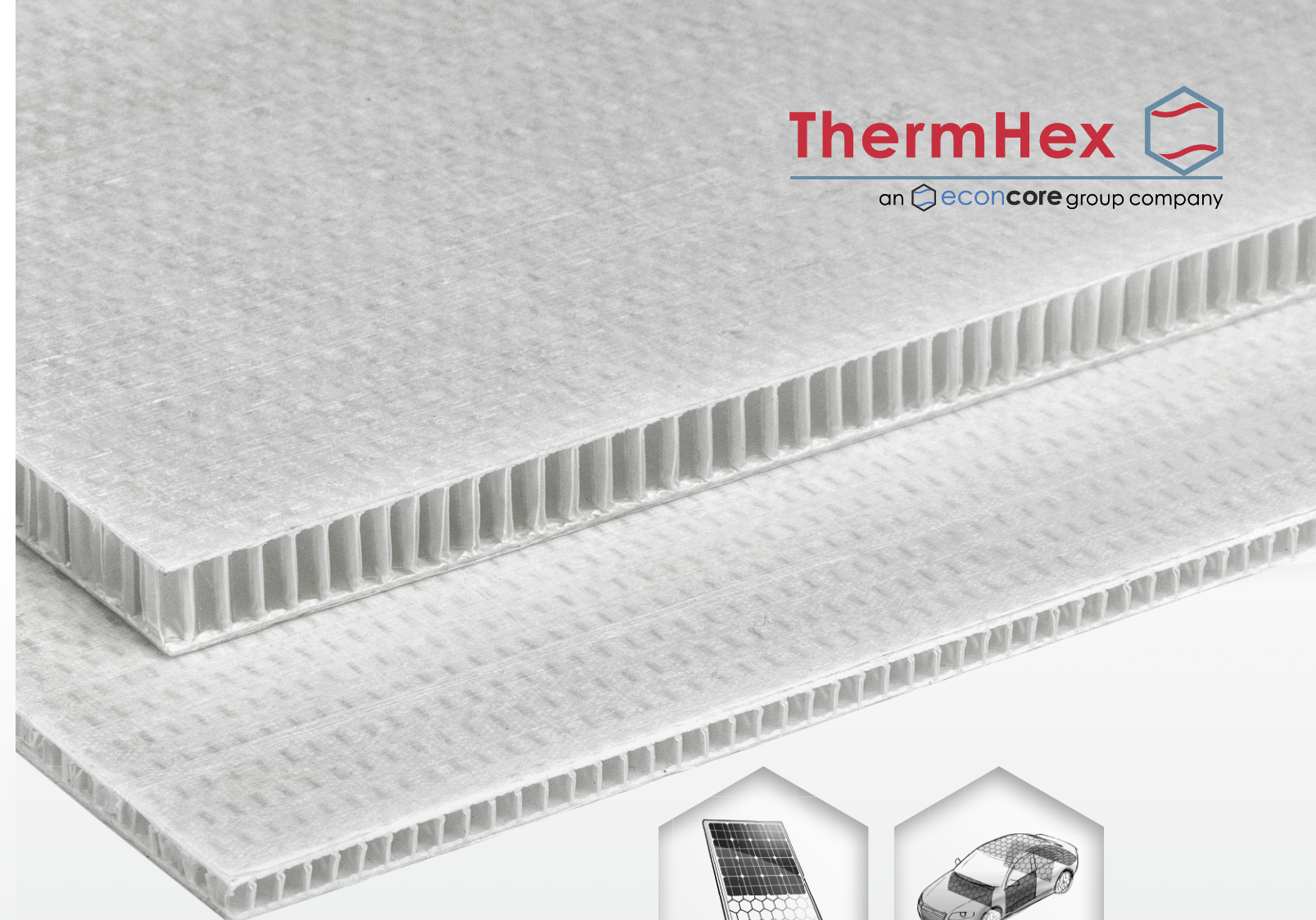
100% RECYCLABLE PP

SHORT CYCLE TIMES

FUNCTIONALISATION BY INJECTION MOULDING



Main automotive applications of ThermHex PP sandwich panels



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## THERMHEX PP SANDWICH PANELS

THERMHEX POLYPROPYLENE HONEYCOMB CORES WITH GF/PP COMPOSITE SKINS

NEW PRODUCT

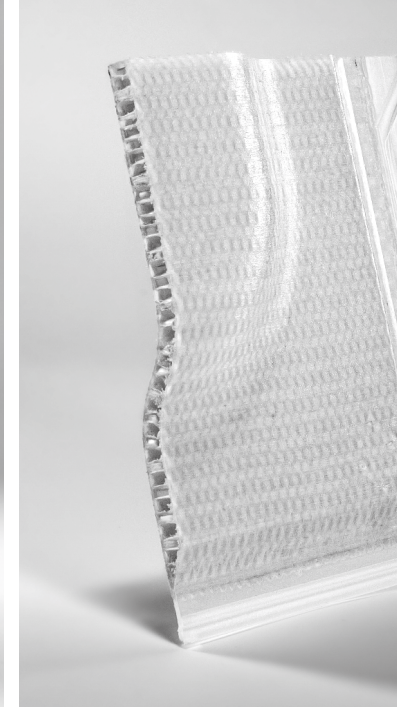
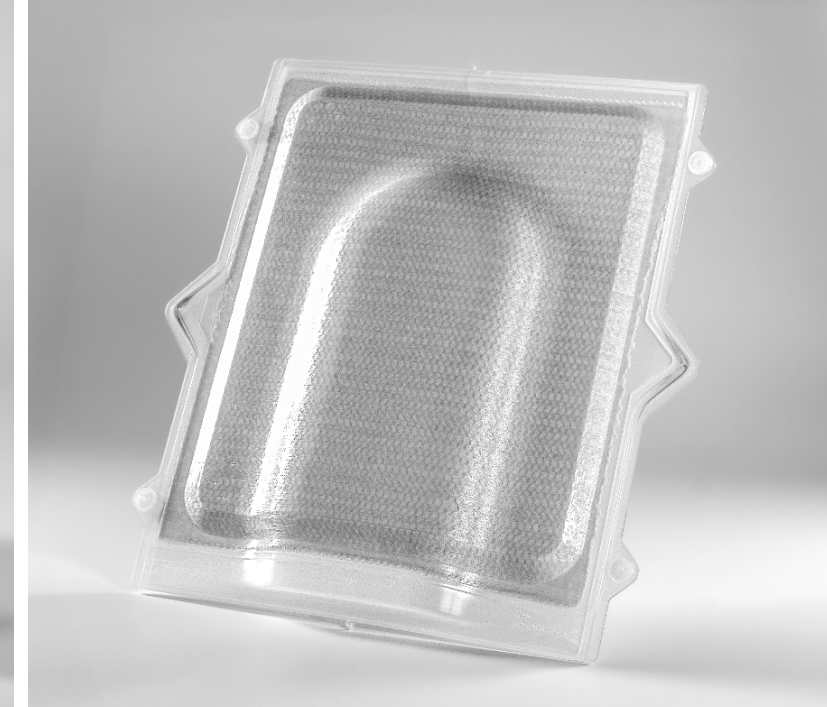
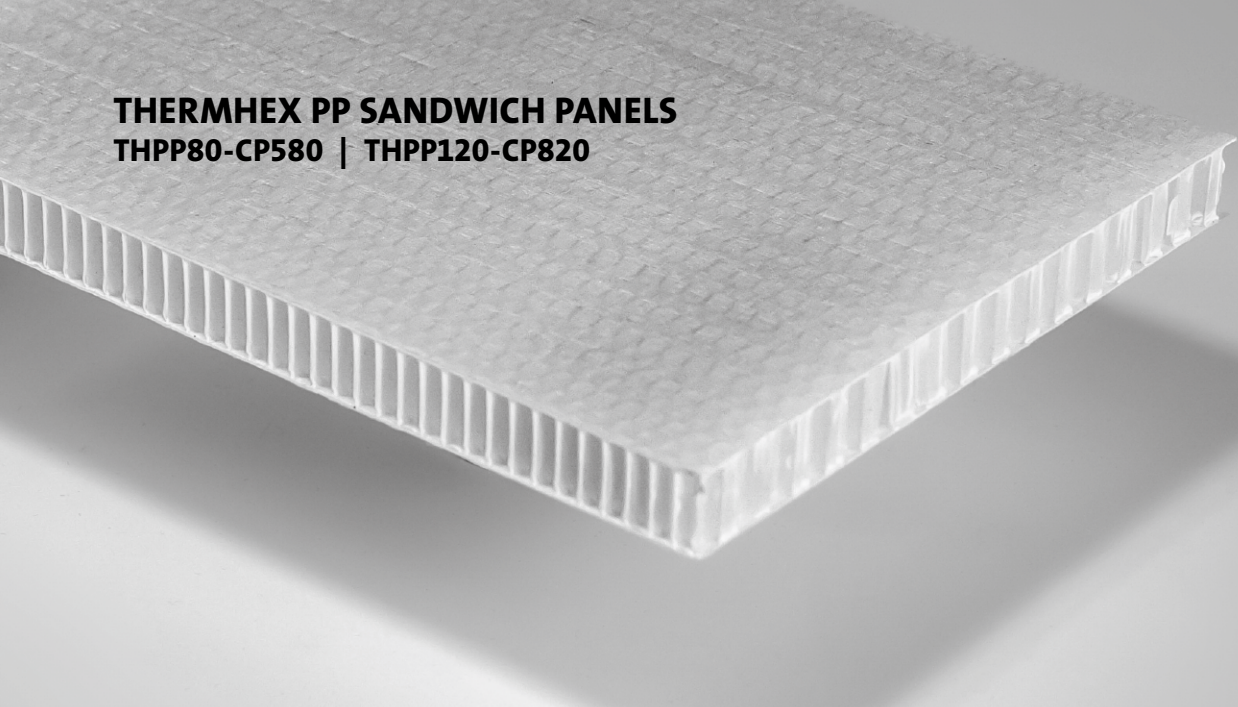


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THPP80-CP580 | THPP120-CP820



## TECHNICAL DATA

### THPP80-CP580

Sandwich thickness (mm)	6.0
Skin layer thickness (mm)	0.35
Core thickness (mm)	5.2
Cell size (mm)	4.0
Sandwich density (kg/m³)	280–290
Core density (kg/m³)	80–90
Weight per unit area (g/m²)	1700
Bending stiffness* (CD, L/MD, W) (Nm)	90 / 70
Compressive strength (Z-direction) (MPa) (ASTM C365)	1.2
Compressive modulus (Z-direction) (MPa) (ASTM C365)	25
Shear strength (CD, L/MD, W) (MPa) (ASTM C273)	0.5 / 0.3
Shear modulus (CD, L/MD, W) (MPa) (ASTM C273)	15 / 6

### MEDIUM DENSITY PP HONEYCOMB WITH 0.35 mm CROSSPLY SKINS FROM PP/GF UD TAPES

6THPP80-CP580	12THPP80-CP580	15THPP80-CP580	20THPP80-CP580	
Sandwich thickness (mm)	6.0	12.0	15.0	20.0
Skin layer thickness (mm)	0.35	0.35	0.35	0.35
Core thickness (mm)	5.2	11.2	14.2	19.2
Cell size (mm)	4.0	5.0	5.0	5.0
Sandwich density (kg/m³)	280–290	180–190	165–175	145–155
Core density (kg/m³)	80–90	80–90	80–90	80–90
Weight per unit area (g/m²)	1700	2240	2510	2960
Bending stiffness* (CD, L/MD, W) (Nm)	90 / 70	420 / 290	600 / 400	1000 / 420
Compressive strength (Z-direction) (MPa) (ASTM C365)	1.2	1.2	1.2	1.2
Compressive modulus (Z-direction) (MPa) (ASTM C365)	25	40	40	40
Shear strength (CD, L/MD, W) (MPa) (ASTM C273)	0.5 / 0.3	0.5 / 0.3	0.5 / 0.3	0.5 / 0.3
Shear modulus (CD, L/MD, W) (MPa) (ASTM C273)	15 / 6	15 / 6	15 / 6	15 / 6

### THPP120-CP820

Sandwich thickness (mm)	6.0
Skin layer thickness (mm)	0.5
Core thickness (mm)	5.0
Cell size (mm)	4.0
Sandwich density (kg/m³)	400–410
Core density (kg/m³)	120–130
Weight per unit area (g/m²)	2450
Bending stiffness* (CD, L/MD, W) (Nm)	140 / 125
Compressive strength (Z-direction) (MPa) (ASTM C365)	2.0
Compressive modulus (Z-direction) (MPa) (ASTM C365)	60
Shear strength (CD, L/MD, W) (MPa) (ASTM C273)	1.2 / 0.5
Shear modulus (CD, L/MD, W) (MPa) (ASTM C273)	50 / 16

### HIGH DENSITY PP HONEYCOMBS WITH 0.5 mm CROSSPLY SKINS FROM PP/GF UD TAPES

6THPP120-CP820	12THPP120-CP820	15THPP120-CP820	20THPP120-CP820	
Sandwich thickness (mm)	6.0	12.0	15.0	20.0
Skin layer thickness (mm)	0.5	0.5	0.5	0.5
Core thickness (mm)	5.0	11.0	14.0	19.0
Cell size (mm)	4.0	5.0	5.0	5.0
Sandwich density (kg/m³)	400–410	260–270	235–245	210–220
Core density (kg/m³)	120–130	120–130	120–130	120–130
Weight per unit area (g/m²)	2450	3200	3590	4240
Bending stiffness* (CD, L/MD, W) (Nm)	140 / 125	590 / 475	900 / 600	1600 / 700
Compressive strength (Z-direction) (MPa) (ASTM C365)	2.0	2.4	2.4	2.4
Compressive modulus (Z-direction) (MPa) (ASTM C365)	60	140	140	140
Shear strength (CD, L/MD, W) (MPa) (ASTM C273)	1.2 / 0.5	1.2 / 0.5	1.2 / 0.5	1.2 / 0.5
Shear modulus (CD, L/MD, W) (MPa) (ASTM C273)	50 / 16	50 / 16	50 / 16	50 / 16

Core material	Polypropylen (PP)
Temperature range (°C)	–30 to +80, short term up to +140
Thermal conductivity (W / (m·K))	0.060–0.070
Fire-resistance	Normally inflammable, higher grades of fire-resistance can be obtained in sandwich elements when using specialised surface modification.
Chemical resistance	Excellent resistance to water, most acids, bases and salt solution, limited UV resistance
Standard dimensions (MD, W x CD, L) (mm)	2500 x 1200

\* at 400 mm span length in 3P8-test

## THERMOPLASTIC HONEYCOMB SANDWICH PROCESSING

