

Qingdao Achieving Honeycomb Panel Co., Ltd.

青 岛 智 新 成 复 合 板 材 有 限 公 司

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Custom PP Honeycomb Core for High-Strength Insulated Seafood Transport Containers

- **Client Profile & Cold-Chain Industry Dynamics**

Client Profile: This technical case involves a Chinese client of us which specialized manufacturers of cold-chain aquaculture fish boxes and vehicle-mounted seafood transport crates. These B2B clients procure lightweight structural core materials in bulk for in-house downstream lamination and final box assembly.

Industry Technical Dynamics: Modern long-haul perishables logistics relies heavily on three core technological pillars: **thermal insulation, optimized air circulation, and precise humidity control**. For aquaculture transport, these pillars impose extremely harsh physical and chemical demands on the structural integrity of vehicle-mounted insulated boxes (fish boxes).



Technical solution engineered by R&D Department
at Qingdao Achieving Honeycomb Co., Ltd. 2026.

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• Industry Pain Points & Cold-Chain Material

To maintain live seafood quality during long-distance transit, the container's micro-environment must be strictly regulated. Traditional insulation materials (such as standard EPS/expanded polystyrene foam) expose critical structural failures under field conditions:

Pain Point 1: Fatigue Cracking & Staggering Replacement Costs

Standard foam boxes lack structural flexibility. Under continuous road vibrations and impact loads during loading/unloading, they suffer from micro-cracking and fluid leakage. Treating these boxes as single-use packaging generates massive, unsustainable annual replacement costs for logistics enterprises.

Pain Point 2: Thermal Bridge Leaks (Insulation Degradation)

Refrigerated logistics demands a minimized heat transfer coefficient (U-factor). While foam plastics inherently possess low thermal conductivity, their structural fragility under external stress creates air gaps and thermal bridges. Once the box body deforms or cracks, the efficiency of the vehicle's entire refrigeration unit drops sharply. High-density live transport requires a rigid, high-strength core that delivers permanent structural sealing.

Pain Point 3: Weight Gain & Delamination Under High Humidity (85%–95% RH)

To keep seafood fresh and avoid dehydration, the interior environment must maintain a **high relative humidity of 85% to 95%**, often combined with direct top-icing or saltwater spraying. Under powerful air circulation, traditional wood or inferior solid plastic cores absorb moisture over time, leading to mold growth, warping, and **significant weight gain**. This added dead weight directly increases vehicle fuel consumption and shortens the container's service life.



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- **Engineering Solution: Specialized PP Non-Woven Honeycomb Core**

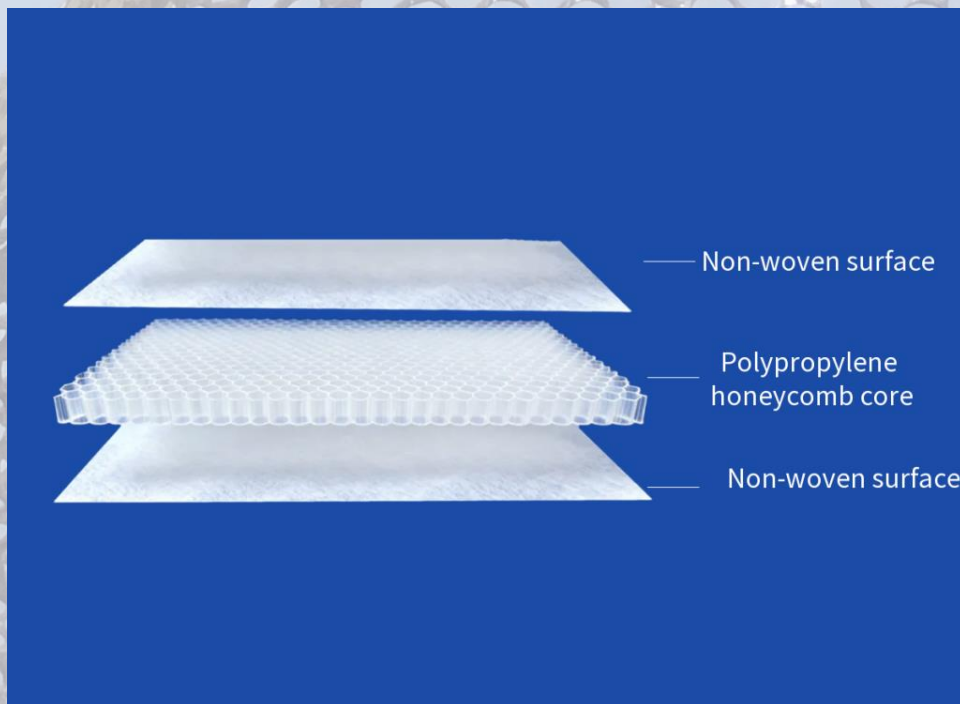
To address raw material procurement challenges and downstream secondary processing requirements, we engineered a **Polypropylene (PP) Honeycomb Core integrated with a Non-Woven Fabric Layer**.

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Substrate: Integrated PP honeycomb structure with a thermally bonded non-woven fabric skin, providing an ultra-flat surface and superior mechanical anchoring.

Resin-Barrier Technology & Processing Compatibility: The specialized non-woven layer acts as an effective barrier that **prevents excessive resin consumption (absorption into honeycomb cells)** while ensuring cross-linking compatibility with epoxy, polyester, or vinyl ester resins. Perfect for wet layout, vacuum bagging, and hot-press molding—guaranteed zero delamination and zero blistering.

On-Demand Industrial Customization: Scalable adjustments for cell diameter, core thickness, non-woven areal weight (g/m^2), and sheet dimensions to match diverse vehicle-mounted fleet specifications.



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• Technical Performance & Material Advantages

High-Bonding Interface for Maximum Yield (Core Advantage): The integrated non-woven layer provides an exceptional mechanical interlocking surface for resins and fiberglass. This high peel-strength interface prevents delamination under thermal expansion and contraction, drastically increasing the finished box yield rate and reducing factory scrap rates.

High Strength-to-Weight Ratio vs. Fuel Efficiency: The hollow geometric structure of the PP honeycomb significantly reduces dead weight compared to traditional plywood or solid plastic sheets. Once laminated with fiberglass skins, the sandwich panel exhibits extreme flexural rigidity and impact resistance, enduring heavy road shocks while lowering vehicle fuel consumption.

Hydrophobic & Chemical Immunity: Pure Polypropylene (PP) is highly hydrophobic (near-zero water absorption) and inert to seawater, salt spray, acids, and alkalis. It eliminates the risk of rot, decay, or moisture-induced deformation under prolonged low-temperature, high-salinity conditions, maintaining a stable U-factor throughout its lifecycle.

Automated Mass Production Readiness: High dimensional stability, uniform tensile toughness, and excellent flatness tolerate high-speed automated feeding and cutting, maximizing manufacturing throughput.



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- **Solution Value Summary**

Our **PP Honeycomb Core for Marine & Aquaculture Applications** solves the four core manufacturing bottlenecks of aquaculture box producers: **excessive weight, moisture corrosion, difficult resin lamination, and inconsistent product yield.**

Backed by a deep understanding of cold-chain thermodynamics and fluid dynamics, we deliver a premium, highly processable core material. We empower manufacturers to fabricate premium vehicle-mounted aquaculture boxes that are **lightweight, structurally robust, seawater-proof, and exceptionally long-lasting**, directly enhancing your brand's competitive edge in the commercial B2B procurement market.

- **Extended Customization Matrix**

Core Thickness Tuning (mm) & Precise Bevel/Straight Sheet Cutting

Cell Size Optimization for Tailored Compression Strength

Areal Weight Adjustments of Non-Woven Facings for Varied Resin Viscosities

Reinforced Multi-Layer Skins and Customized Irregular Geometries



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Polypropylene Honeycomb “P8T40” Non woven

SPECIFICATION			
Dimensions	standard : 1220 x 2440 mm	export : 1150 x 2300 mm	
Thickness	5-100mm or customized		
Cell size	8mm		
Density without facing	80kg/m ²		
Color	white		
Coating	nature	weight	
Non-woven	Polyester	40g/m ²	
Possible process	RTM, closed moulds		
CHARACTERISTICS			
Properties	Test method	PP8T40	
Flatwise tensile	ASTM C 297	Typical Strength psi/Mpa	130/0.89
Bare compression	ASTM C 365	Typical Strength psi/Mpa	275/1.89
		Typical Modulus ksi/Mpa	11.5/79.2
Plate Shear	ASTM C 273	Typical Strength psi/Mpa	85/0.58
		Typical Modulus ksi/Mpa	2.2/15.2
Water resistance,% retention of shear strength - 20°C	ASTM C393	±100%**	
Heat resistance for honeycombs core THK 20mm	R=0.3m ² .°C/W (soitλ=0.067W/(m.°C)		
Heat resistance for honeycombs core THK 90mm	R=0.6m ² .°C/W (soitλ=0.014W/(m.°C)		
Behaviour with fire	Standard quality inflammable, Possibility of M1/F0 classification for finished sandwich panels, depending on the sandwich skin		
Chemical Properties	Excellent resistance to water and most acids, bases and salt solutions		
Resistance to Ultraviolet rays(U.V.)	The longevity for the core's storage is guaranteed by a anti U.V.-U.V. protection of the finished panel is ensured by the skins of the sandwich panel		
Shocks resistance	Increased by the use of pp honeycomb		

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