

Qingdao Achieving Honeycomb Panel Co., Ltd.

青 岛 智 新 成 复 合 板 材 有 限 公 司

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Custom PC Honeycomb Air Curtain Showcase panel (Bevel Cut) for Leading South American Commercial Manufacturer

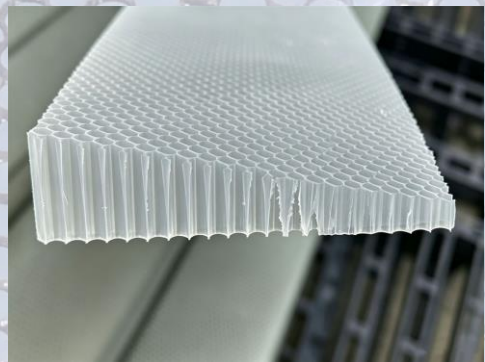
- **Client Profile**

Market Position: A leading South American OEM/ODM manufacturer of **Commercial Refrigerated Cabinets / Commercial Coolers & Freezers Glass.**

Business Scope: Specializes in vertical **open-front multi-decks/Glass Door**

Merchandisers, beverage coolers for convenience stores, and fresh food Reach in showcases. Their products sell widely across Brazil, Argentina, Chile, and other south America markets. They possess extensive experience in temperature control under highly humid and hot South American climates.

Sourcing Channel: Initial inquiry via our official website, followed by in-depth email consultations.



- **Main Requirements**

Material Specification: Must be **100% virgin Polycarbonate (PC)**. Key properties require excellent low-temperature performance, high flame retardancy, and UV resistance (to withstand prolonged exposure to supermarket lighting). The colour specified is a premium Grey.

Customization Need: The air outlet honeycomb panels require **specialised Bevel cutting** at specific angles—classified as a non-standard, custom-shaped component.

Order Scale: Approximately 300 to 500 pieces per batch. This follows a high-frequency, multi-variety, small-to-medium batch Just-In-Time (JIT) lean manufacturing model.

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

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• Our Engineered Technical Solution

high-precision custom tooling fixtures and automated specialized machining:

Solution 1: Custom Angled Contour Fixtures (With Specialized Cutting Accessories)

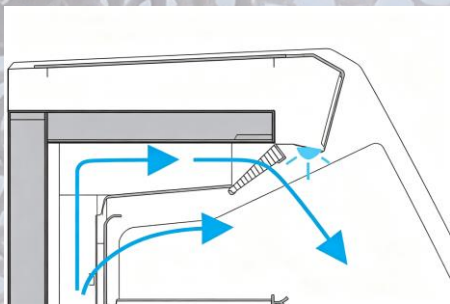
We engineered dedicated **10° /20° /30° /45°** fixed-angle contour clamping fixtures specifically for this Grey PC honeycomb panel. By locking the panel securely during machining, we eliminate lateral vibration during physical cutting, controlling the cut surface **flatness tolerance within $\pm 0.04\text{mm}$** .

Solution 2: High-Speed, Zero-Thermal-Deformation Micro-Cutting

Using **self-developed automatic cutting tools** paired with high rotational speeds and low feed rates, we achieve rapid "split-second" Bevel cuts. This process generates zero secondary thermal deformation (preventing the PC material from melting and clogging the cells) and completely eliminates burrs and edge chipping. This boost in processing efficiency by 300% successfully compresses customisation costs to fit comfortably within the client's budget and shortened the lead time for from one month to around 15 days, significantly reducing the waiting time for our client.

Solution 3: Raw Material Q&A & Green Compliance Assurances

We strictly source premium, virgin Grey/ Black PC resin from world-class manufacturers such as **Wanhua Chemical**. All materials come with factory certification for **RoHS** and food-contact compliance (which is essential for open-front meat and deli cases in supermarkets). This guarantees that the finished products are completely odourless and free of toxic releases.



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• **Design Intent & Performance Advantages (Physics Breakdown)**

Why is a sloped, Bevel-cut design essential?

Standard flush (90° right-angle) air outlets introduce a critical defect during commercial showcase operation. When the internal cold air meets the external warm, humid ambient air at the outlet, the shear force creates a boundary vortex. This traps warm, humid air, leading to rapid condensation, frosting, and ice blockages on the honeycomb surface. This disrupts the overall airflow distribution and forces the display case into frequent, energy-draining defrost cycles.

The Bevel cut design completely disrupts the flow field that allows humid air to pool horizontally. It creates a sloped pressure gradient, allowing the airflow to sink naturally with gravity. This smoother flow fundamentally extends the showcase's automatic defrost cycle.

Main Technical Advantages

Advantage Dimension	Physical & Design Mechanism	Core Value for Supermarkets & End-Users
1. Precise Laminar Air Curtain	The Bevel-cut angle (e.g., 10°) forces and guides the airflow downward, tightly hugging the glass interior or front edge to maintain a perfect laminar flow state without dispersion.	Flawless Curtain Coverage: Completely seals the entire height of the opening, even during frequent door openings or high-foot-traffic interruptions.
2. High-Efficiency Thermal Barrier	The cold air curtain transforms into an impermeable, invisible "air wall."	Zero Cold Air Loss: Drastically cuts down external ambient heat penetration (up to 25° C+) into the cabinet, significantly reducing compressor load.
3. Elimination of Glass Fogging	A continuous, uniform air stream constantly removes relative humidity from the inside of the glass, eliminating the temperature differential.	Crystal-Clear Merchandising: Eliminates persistent fog and condensation, ensuring optimal product visibility and driving consumer impulse purchases.
4. Low Airflow Resistance (Energy Saving)	Features an open Round honeycomb structure with an open-area ratio exceeding 92% . Even after Bevelcutting, back pressure remains virtually zero.	Reduced Fan Power Consumption: Adds zero extra resistance to the circulation fans, ensuring the motors operate in their lowest power consumption range.

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- **Proven Results: Real Client Feedback**

The South American client replaced the original straight-cut air ducts in their flagship vertical double-door beverage cooler with our custom **10° Bevel-cut Grey PC honeycomb panels Air Flow Straightener** for rigorous laboratory testing.

The Results: Under extreme testing conditions at **75% Relative Humidity (RH)**, the glass fogging phenomenon Effectively vanished, and the total energy consumption of the entire unit dropped by approximately **10.3%**.



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Polycarbonate Honeycomb “PC3.5”

SPECIFICATION		
Dimensions	standard: 1220 x 2440 mm	export: 1150 x 2300 mm
Thickness	2.2-1000mm or customized	
Cell size	3.5mm	
color	transparent/black/grey	
Style	Material	Density
PC3.5	Polycarbonate	90kg/m²
Possible process	RTM, closed moulds	
CHARACTERISTICS		
Properties		data
Typical Bare Compressive	Strength Mpa	2.2
	Mudulus Mpa	115
Typical Plate Shear	Strength Mpa	1.3
	Mudulus Mpa	22
CAUTION		
Behaviour with fire	Flame retardant level 2, i.e. B2 level. The ignition point of the PC board itself is 580 °C, and it will self extinguish after leaving the fire. It does not produce toxic gases during combustion and will not promote the spread of the fire.	
Chemical Properties	Excellent resistance to water and most acids, bases, and salt solutions, good heat and cold resistance.	
Weather ability	The heat resistant temperature range of PC material is -45℃-135℃. At -30℃ does not occur cold brittle, at 120℃ does not soften, in the harsh environment of its mechanics, mechanical properties have no significant change.	
Light transmittance	Transparent honeycomb panel transmittance of up to 90%.	

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Polycarbonate Honeycomb “PC6”

SPECIFICATION		
Dimensions	standard: 1220 x 2440 mm	export: 1150 x 2300 mm
Thickness	2.2-1000mm or customized	
Cell size	6mm	
color	transparent/black/grey	
Style	Material	Density
PC6	Polycarbonate	80kg/m²
Possible process	RTM, closed moulds	
CHARACTERISTICS		
Properties		data
Typical Bare Compressive	Strength Mpa	1.6
	Mudulus Mpa	95
Typical Plate Shear	Strength Mpa	0.5
	Mudulus Mpa	19
CAUTION		
Behaviour with fire	Flame retardant level 2, i.e. B2 level. The ignition point of the PC board itself is 580 °C, and it will self extinguish after leaving the fire. It does not produce toxic gases during combustion and will not promote the spread of the fire.	
Chemical Properties	Excellent resistance to water and most acids, bases, and salt solutions, good heat and cold resistance.	
Weather ability	The heat resistant temperature range of PC material is -45℃-135℃. At -30℃ does not occur cold brittle, at 120℃ does not soften, in the harsh environment of its mechanics, mechanical properties have no significant change.	
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