

1. Product Overview

1.1 Product Identifier

Product Name: Ballesta® Aurealis Curved Baffle System

Product Code: [Customizable, e.g., AU-CBV-200x500x3000-1.0]

The Ballesta Aurealis Curved Baffle System pushes the boundaries of conventional ceiling design by bending aluminum sheets into graceful, organic curves and sculptural three-dimensional forms. While traditional baffles follow straight lines, Aurealis uses the exceptional formability of AA3003/AA5005 series aluminum to create flowing, artistic compositions that transform large interior spaces into architectural statements. Each curved baffle panel is custom-formed to project-specific radii and profiles, with double-side powder coating for open-view installations. Panel thickness ranges from 0.8mm to 2.0mm, with maximum length up to 4000mm. Available in all RAL colors, dual-side color combinations, and with integrated LED lighting provisions.

2. Technical Specifications

Item	Specification	Test Standard
Aluminum Substrate Material	Indoor: AA 3003 (H24 Temper) Outdoor: AA 5005 (H24 Temper)	YS/T429.1, GB/T3190-2020
Baffle Section Size	Width: Custom, typical 50–300mm Height: Custom, typical 100–1000mm Length: ≤4000mm Tolerance: ±1.0mm	ISO 2768-m, Project Drawing
Panel Thickness	1.0mm (standard); 0.8–2.0mm available Tolerance: ±0.05mm (≤1.5mm)	YS/T429.2, ASTM B209

	±0.08mm (> 1.5mm)	
Surface Treatment	Double-side polyester powder coating Double-side pre-coated coil option RAL colors, custom metallic, dual-side colors	Qualicoat / GSB Standards
Coating Thickness	Powder coating: 60–80µm per side Pre-coated coil: 20–25µm per side	ASTM D7091
Installation Method	Direct clip or integrated keel suspension Anti-fall clips on all suspension points Reversible for individual panel removal	Project-specific engineering
Color Performance	All RAL colors + custom metallic Dual-side color combinations available Monochrome $\Delta E^*_{ab} \leq 1.0$ Batch-to-batch $\Delta E^*_{ab} \leq 1.5$	ISO 7724-1
Adhesion Strength	Cross-cut test: Classification $\geq 4B$ (No peeling along cut edges)	ASTM D3359
Coating Hardness	Pencil hardness: $\geq HB$ (No permanent indentation at 1kg load)	ASTM D3363
Fire Resistance Rating	Class A1 (non-combustible) Flame spread index ≤ 25 Smoke developed index	EN 13501-1, ASTM E84

	≤450	
Flatness	≤1.5mm/m (any direction) No visible waviness at 3m viewing distance	YS/T429.1, Project Spec
Wear Resistance	No visible wear/color loss after 500 cycles (Taber abraser, CS-10 wheel, 1000g load)	ASTM D4060
Corrosion Resistance	Salt spray: ≥1000h (ASTM B117) No blistering/creepage >2mm from scribe Humidity: ≥1000h @ 38°C/100% RH	ASTM B117, ASTM D2247
Tensile Strength	3003-H24: 145–180 MPa 5005-H24: 145–180 MPa Elongation: ≥4%	GB/T3880, ASTM E8
Curve Radius Tolerance	Minimum bend radius: 3× material thickness Radius accuracy: ±2.0mm S-curve & variable radius: per project spec	Project Engineering, Template Verification
Density	2.70 g/cm ³	ASTM D792

3. Manufacturing Process

3.1 Material Cutting & Blank Preparation:

Precision cutting of AA3003/AA5005 series aluminum sheet to specified blank dimensions based on the final curved profile, width and height requirements (0.8–2.0mm thickness). Blanks are deburred and inspected for edge quality before forming. Dimensional tolerance: ±1.0mm. For complex multi-radius profiles, compound blank development is calculated using CAD flattening algorithms.

3.2 CNC Curving & Profile Forming:

The aluminum blanks are progressively curved using CNC-controlled roller bending or press forming equipment. Multiple passes (typically 3–5) are used to achieve the designed radius without over-stressing the material. For S-curves and variable-radius profiles, segmented roll-bending with incremental position adjustment is employed. Each curved panel is checked against a full-scale template or CNC-measured profile to ensure radius accuracy within $\pm 2.0\text{mm}$.

3.3 Edge Forming & Stiffening:

Longitudinal edges are folded or formed to create stiffening ribs and clip-engagement profiles. Edge fold angle is controlled to $90^\circ \pm 1^\circ$ with consistent fold width. For panels exceeding 3000mm in length or with complex curvature, additional transverse stiffening ribs may be incorporated to maintain panel flatness and resist torsional deformation during handling and installation.

3.4 Surface Pretreatment:

Degreasing, chemical etching, and chromate-free conversion coating (Cr(VI)-free) treatment on all aluminum surfaces to enhance coating adhesion and corrosion resistance. The pretreatment process follows a six-tank immersion sequence: alkaline degrease → water rinse → acid etch → water rinse → conversion coating → DI water rinse → drying. For double-side coating, both surfaces receive identical pretreatment.

3.5 Coating Application:

Application of polyester powder coating (60–80 μm per side) or optional specialized finishes per project specification. Both sides are coated to the same standard for open-view installations. Powder coating is cured in a controlled convection oven at 180–200°C for 10–15 minutes. Dual-side color options are supported with separate coating passes. All coated surfaces are inspected for uniformity, pinhole defects, and gloss consistency. Pre-coated coil option available for high-volume projects.

3.6 Quality Inspection & Packing:

Each finished curved baffle undergoes multi-point inspection: dimensional tolerance ($\pm 1.0\text{mm}$), profile radius accuracy ($\pm 2.0\text{mm}$), flatness ($\leq 1.5\text{mm/m}$), coating thickness (60–80 μm), color difference ($\Delta E^*_{ab} \leq 1.0$), and adhesion (cross-cut, ASTM D3359, $\geq 4B$). Curved panels are individually wrapped in PE film with custom-shaped foam supports to prevent deformation during transport. Packed in labeled wooden crates with installation orientation diagrams. Anti-fall clips are included with each panel.

4. Application Scope

This Aurealis curved baffle system is widely used in architectural ceiling and feature wall applications requiring artistic expression, including but not limited to:

- Airport terminals and transportation hubs requiring large-scale visual impact
 - Museum exhibition halls, theaters and auditoriums with high architectural standards
 - Hotel lobbies, corporate atriums and retail flagship stores
 - Conference centers, shopping malls and public gathering spaces
 - Feature ceilings and sculptural installations where straight profiles cannot achieve the desired design intent
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5. Compliance Standards

- **GB/T3190-2020: Chemical Composition of Wrought Aluminum and Aluminum Alloys**
- **GB/T3880: Aluminium and Aluminium Alloy Plates and Sheets for General Industrial Use**
- **EN 13501-1: Fire Classification of Construction Products and Building Elements (Class A1)**
- **ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials**
- **ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate**
- **ASTM D3359: Standard Test Methods for Measuring Adhesion by Tape Test**
- **ASTM D7091: Standard Practice for Nondestructive Measurement of Dry Film Thickness**
- **ISO 7724-1: Paints and Varnishes — Colorimetry — Part 1: Principles**

6. Packaging & Storage

Packaging: Each Aurealis curved baffle is individually wrapped in PE film with custom-shaped foam supports to preserve the curved profile during transit and storage. Corner protectors at all exposed edges. Panels are packed in labeled wooden crates with layer-separating foam padding. Each crate includes an installation orientation diagram. Anti-fall clip hardware is packed separately within each crate.

Storage: · Store in a dry, ventilated and rainproof warehouse, avoid direct sunlight, high temperature ($>70^{\circ}\text{C}$) and high humidity ($\text{RH}>85\%$).

· Avoid contact with sharp objects, chemicals and corrosive substances to prevent surface damage and substrate corrosion.

· Curved baffles must be stored horizontally on flat, even surfaces. Stacking height shall not exceed 2 layers to prevent profile deformation.

· The storage site shall be far away from fire sources to meet the fire safety requirements of Grade A1 fire-resistant materials.

7. Quality Assurance

All Aurealis curved baffles undergo strict multi-item quality inspection before delivery, including dimensional tolerance, profile radius accuracy ($\pm 2.0\text{mm}$ against template), surface finish uniformity, color difference ($\Delta E^*_{ab} \leq 1.0$), coating thickness ($60\text{--}80\mu\text{m}$ per side), adhesion strength (ASTM D3359, $\geq 4\text{B}$), and flatness ($\leq 1.5\text{mm/m}$). A curved profile conformity report is provided with each shipment for quality verification.

Ballesta provides a warranty period of not less than 15 years for the product coating system (under normal use conditions and compliance with installation and maintenance guidelines). Curved profile integrity is warranted against manufacturing defects for a period of 5 years.

