

1. Product Overview

1.1 Product Identifier

Product Name: Ballesta® 3D Ceiling Panels

Product Code: 3DCP-[Pattern]-[Size] (e.g., 3DCP-IF-600x600)

Ballesta 3D ceiling panels transform ordinary ceilings into dramatic architectural features. Three-dimensional metal panels with geometric relief patterns are precision press-formed using hydraulic stamping technology. Available patterns include butterfly, ice flower, water ripple, cloud, diamond, honeycomb, wave, and custom designs. Manufactured from high-quality AA1100 or AA3003 aluminum alloy with pattern depth adjustable from 3mm to 30mm. Standard sizes: 600x600mm, 600x1200mm, 1200x2400mm. Custom sizes up to 1500mm x 3000mm. Panel thickness: 0.8mm to 2.0mm. CNC-controlled tooling guarantees pattern positioning within 0.5mm. Surface finishes: powder coating (RAL), PVDF fluorocarbon, anodizing, wood grain transfer, and mirror polish. Installation via clip-in, lay-in, or hook-on grid systems. Ideal for hotel lobbies, retail stores, corporate reception areas, restaurant ceilings, and entertainment venues requiring high visual impact.

2. Technical Specifications

Material	AA1100 / AA3003 Aluminum Alloy	ASTM B209, GB/T 3880
Panel Thickness	0.8 mm – 2.0 mm Tolerance: ± 0.1 mm	ASTM D7091, ISO 16809
Standard Sizes	600×600 mm, 600×1200 mm, 1200×2400 mm	ISO 128, Project specification
Custom Sizes	Up to 1500 mm × 3000 mm	Per project specification
Pattern Depth	3 mm – 30 mm (customizable)	Per project specification
Pattern Registration	± 0.5 mm between adjacent panels	CNC tooling calibration

Pattern Options	Butterfly, Ice Flower, Water Ripple, Cloud, Diamond, Honeycomb, Wave, Custom	Per project design
Forming Method	Hydraulic press forming with matched metal dies	Project specification
Surface Finishes	Powder coating (RAL), PVDF (Kynar 500®), Anodizing, Wood grain, Mirror polish	AAMA 2605 / Qualicoat
Coating Thickness	Powder coating: 60-80 µm PVDF: 25-35 µm Anodizing: 10-25 µm	ASTM D7091
Installation System	Clip-in, Lay-in (T-grid), or Hook-on grid system	AAMA 501.6
Fire Resistance	Class A1 – Non-combustible Melting point: 660°C (aluminum)	EN 13501-1, GB 8624 A1
Color Consistency	$\Delta E^*_{ab} \leq 2.0$ (batch-to-batch)	ISO 7724-1
Adhesion Strength	Grade 0 (0% removal) in cross-hatch tape test	ASTM D3359
Gloss Level	15-30° (matte) or 30-60° (semi-gloss)	ASTM D523
Density	2.70 g/cm ³ (aluminum)	ASTM D792
Weight (approx)	2.2-5.4 kg/m ² (depending on thickness and pattern depth)	Calculation

3. Manufacturing Process

3.1 Design & Pattern Development:

Client design reference or pattern specification is reviewed and modeled in 3D CAD.

Pattern geometry developed for optimal press forming results. Tooling design includes draft angles, material springback compensation, and pattern repeat registration. Sample panels produced for design validation before full production tooling commitment.

3.2 Tooling & Die Fabrication:

Precision matched metal dies are CNC-machined from hardened tool steel. Die surfaces are polished to mirror finish for crisp pattern transfer. Pattern depth, edge definition, and repeat registration verified on trial stampings. Tooling accuracy ensures pattern positioning within $\pm 0.5\text{mm}$ across all panels.

3.3 Material Cutting & Preparation:

AA1100 or AA3003 aluminum alloy sheet cut to specified blank dimensions using CNC shearing or laser cutting. Material thickness verified: 0.8mm-2.0mm. Sheet flatness checked before forming. Edges deburred. Material grade and temper verified against incoming certification.

3.4 Hydraulic Press Forming:

Pre-cut aluminum blanks positioned in hydraulic press with matched metal dies. Precision pressure control ensures consistent pattern depth (3-30mm) and crisp edge definition across entire production run. Pattern registration maintained within $\pm 0.5\text{mm}$ between adjacent panels. Formed panels inspected at set intervals for depth consistency, edge quality, and surface finish.

3.5 Surface Finishing:

Formed panels undergo surface pretreatment (degreasing and chrome-free conversion coating). Finish applied per specification: powder coating (60-80 μm , RAL colors), PVDF fluorocarbon (25-35 μm , Kynar 500® resin), anodizing (10-25 μm), wood grain transfer printing, or mirror polish. Gloss level: 15-30° (matte) or 30-60° (semi-gloss).

3.6 Inspection, Labeling & Packaging:

Each panel undergoes dimensional check (width, length, flatness, pattern depth), coating thickness measurement (per ASTM D7091), color consistency ($\Delta E^*_{ab} \leq 2.0$), pattern registration verification, and visual inspection. Panels numbered per installation sequence with layout drawings. Protected with PE film, bundled with foam interlayers, packed in wooden crates.

4. Application Scope

Ballesta 3D ceiling panels are designed for interior ceiling and feature wall applications requiring decorative visual impact and design distinction. Widely used in the following environments:

- Hotel lobbies, restaurant ceilings, and corporate reception areas requiring signature architectural statements
 - Retail stores, shopping malls, brand flagship stores, and boutique showrooms
 - Casino and entertainment venues, nightclubs, and VIP lounges
 - Conference centers, exhibition halls, museum galleries, and performing arts venues
 - Corporate headquarters, office atriums, and premium residential developments
-

5. Compliance Standards

- **ASTM B209 — Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate**
- **ASTM E84 — Standard Test Method for Surface Burning Characteristics of Building Materials**
- **GB 8624 A1 — Non-combustible building material classification (China Grade A)**
- **EN 13501-1 — Fire Classification of Construction Products and Building Elements — Class A1**
- **ISO 9001:2015 — Quality Management Systems (SISA certified)**
- **AAMA 2605 — Superior Performance Organic Coatings on Architectural Aluminum**
- **Qualicoat — Quality Label for Powder Coating on Aluminum**
- **ASTM D3359 — Standard Test Methods for Measuring Adhesion by Tape Test**

6. Packaging & Storage

Packaging: Each 3D ceiling panel is covered with protective PE film to prevent surface scratches and pattern damage. Panels are bundled in stacks (max 15 panels per bundle) with foam interlayers to protect the 3D relief surface. Bundles packed in wooden crates with foam padding at corners and edges. Each crate labeled with pattern name, quantity, color, batch number, and installation layout drawing.

Storage: Store in a dry, ventilated and rainproof warehouse. Avoid direct sunlight, high temperature (above 50°C), and corrosive environments. Stack crates horizontally on flat, level ground. Maximum stacking height: 3 crates.

Avoid contact with sharp objects, chemicals and corrosive substances to prevent surface damage and coating degradation. Do not stack other items on top of panel crates.

Panels should remain in original packaging until immediately before installation. Remove protective film within 24 hours of installation to prevent adhesion residue in warm conditions.

The storage site shall be far away from fire sources to meet the fire safety requirements of Grade A materials.

7. Quality Assurance

All 3D ceiling panels undergo strict multi-item quality inspection before delivery, including dimensional tolerance check (width, length, flatness - $\pm 1\text{mm}$ standard), pattern depth measurement (3-30mm per specification), pattern registration verification across panel edges, coating thickness measurement (magnetic induction per ASTM D7091), color consistency check ($\Delta E^*_{ab} \leq 2.0$ per ISO 7724-1), adhesion test (cross-cut/tape pull per ASTM D3359, Grade 0 requirement), and visual inspection under standard lighting conditions at 3m distance.

Ballesta provides a standard warranty of 10 years for powder-coated 3D ceiling panels

and 15 years for PVDF-coated panels under normal indoor use conditions and proper maintenance. Warranty covers coating integrity (no peeling, cracking, or excessive fading) and structural performance (no corrosion, pattern deformation, or material failure) within the warranty period, subject to correct storage, installation, and maintenance as outlined in the installation manual.
