

1. Product Overview

1.1 Product Identifier

Product Name: Ballesta® Lay-In Ceiling System (T-Bar & Dark Recessed Groove)
 Product Code: [Customizable, e.g., LIC-TB-585x585-0.8 / LIC-DR-585x1185-1.0]
 The Ballesta Lay-In Ceiling System comprises precision-engineered aluminum panels that drop into a suspension grid framework, offering two distinct aesthetic options: the classic T-Bar Grid System with visible exposed grid (System A), and the premium Dark Recessed Groove System with concealed dark-painted grid runners (System B). Available in standard 585×585mm (2'×2' equivalent) and 585×1185mm (2'×4' equivalent) panel sizes in 0.8mm and 1.0mm aluminum alloy thickness. Panels can be specified solid or perforated with acoustic fleece backing for NRC up to 0.80. All systems are non-combustible (Class A per ASTM E84, EN 13501-1), corrosion-resistant, and allow tool-free access to plenum space for maintenance.

2. Technical Specifications

Item	Specification	Test Standard
Aluminum Substrate Material	Indoor: AA 1100 or AA 3003 (H14/H24 Temper) Outdoor: AA 3003 (H24 Temper)	JG/T 450, GB/T 23444, GB/T3190-2020
Panel Dimension	585mm × 585mm (2'×2' equivalent) 585mm × 1185mm (2'×4' equivalent) Error: L±1.5mm, W±1.0mm 585mm × 585mm (2'×2' equivalent) 585mm × 1185mm (2'×4' equivalent) Error: L±1.5mm, W±1.0mm	JG/T 450, ISO 128

Panel Thickness	0.8mm or 1.0mm (Substrate) Thickness Error: $\pm 0.03\text{mm}$	JG/T 450, ASTM B209
Surface Treatment	Polyester Powder Coating (standard) PVDF Fluorocarbon Coating (premium) Anodizing or Wood Grain Transfer (optional)	JG/T 450, AAMA 2605 (PVDF)
Coating Thickness	Powder Coating: 60–80 μm PVDF Coating: 25–35 μm	ASTM D7091 / ASTM B209
Installation System	System A: T-Bar Exposed Grid (visible tee bars) System B: Dark Recessed Groove (concealed grid) T-Bar main runner + cross tee grid at 600mm centers	JG/T 450, AAMA 501.6
Perforation (Optional)	Hole dia: 1.8mm / 2.0mm / 2.5mm / 3.0mm Pattern: Staggered round Open area: 15–28%	Customer Specification
Acoustic Performance	Non-perforated: NRC 0.05–0.10 Perforated + acoustic fleece: NRC 0.65–0.80	ISO 354, ASTM C423
Adhesion Strength	Cross-cut: Classification 0–1 (No peeling per ASTM D3359)	ASTM D3359
Hardness	Coating Pencil Hardness: HB (ASTM D3363)	ASTM D3363
Fire Resistance Rating	Grade A (Non-combustible) per ASTM E84	ASTM E84, EN 13501-1, GB 8624

	Flame Spread Index ≤ 25 , Smoke Developed Index ≤ 450 EN 13501-1: Class A1/A2	
Flatness	$\leq 1.5\text{mm/m}$ (No wavy deformation or uneven deflection)	JG/T 450, GB/T 23444
Color Consistency	$\Delta E^*_{ab} \leq 1.5$ (ISO 7724-1) Visual: Uniform color, no obvious streaks or mottle	ISO 7724-1
Corrosion Resistance	Salt spray resistance: $\geq 1000\text{h}$ (ASTM B117) Humidity resistance: 1000h at 38°C , RH 100%	ASTM B117, ASTM D2247
Tensile Strength	AA1100: 90–120MPa AA3003 H14: 140–180MPa AA3003 H24: 145–190MPa	GB/T3880, ASTM E8
Density	2.70 g/cm^3	ASTM D792

3. Manufacturing Process

3.1 Aluminum Sheet Preparation:

High-quality AA1100 or AA3003 (H14/H24 temper) aluminum coils are decoiled, leveled, and precision-cut to standard panel dimensions (585×585mm or 585×1185mm). Thickness tolerance is held to $\pm 0.03\text{mm}$.

Precision cutting of 3003/5005 series aluminum sheet into 300mm×3750mm size with 0.7mm thickness, ensuring dimensional tolerance (Length $\pm 2\text{mm}$, Width $\pm 1\text{mm}$, Thickness $\pm 0.03\text{mm}$).

3.2 Surface Pretreatment:

Panels undergo a multi-stage chemical cleaning and conversion coating process to remove surface oils, oxides, and contaminants. A chromium-free passivation layer is applied to enhance paint adhesion and corrosion resistance.

Degreasing and dust removal treatment on aluminum substrate surface to enhance the adhesion between UV ink and substrate, and improve the overall corrosion resistance of the panel.

3.3 Surface Coating:

Standard polyester powder coating or premium PVDF fluorocarbon coating is applied via

automated electrostatic spray lines. Coating thickness is maintained at 60–80µm (powder) or 25–35µm (PVDF). Alternative finishes include anodizing and wood grain transfer. Coating environmentally friendly UV ink on the pretreated substrate, precisely controlling ink dosage, printing speed and curing time. The ink is cured by UV technology to form a uniform and firm coating ($\geq 60\mu\text{m}$), and the matte surface gloss is adjusted to 15-25°. Custom texture (wood grain/stone grain) can be printed according to customer requirements with high restoration degree.

3.4 Panel Edge Forming:

Panels are precision-formed on CNC press brakes. For the T-Bar system, panel edges are formed with a flush return flange that seats directly onto the exposed grid. For the Dark Recessed Groove system, a groove is formed on all four edges to accept the dark-painted grid tee, creating a shadow-reveal detail.

Edge folding treatment of the panel with precise control of fold angle ($90^\circ \pm 1^\circ$) and consistent fold width, no visible cracks/distortions at the folds. Seamless splicing design is adopted, and the joint is reinforced by intermittent welding or structural adhesive to ensure structural stability.

3.5 Perforation (Optional):

When specified, panels are perforated on a CNC piercing press with staggered round holes. Standard hole diameters: 1.8mm, 2.0mm, 2.5mm, 3.0mm (open area 15–28%). A black acoustic fleece pad is heat-bonded to the rear face of perforated panels, achieving NRC up to 0.80.

Edge trimming, deburring and flatness calibration of the panel. Multi-point testing of surface gloss, color difference and thickness by professional equipment to ensure all indicators meet the standard.

3.6 Quality Inspection & Packaging:

Each panel is inspected for dimensional accuracy, flatness ($\leq 1.5\text{mm/m}$), coating thickness, color consistency, and edge finish. Panels are interleaved with protective film, bundled, and packed in custom wooden crates with foam corner protectors.

Configure special hangers for ceiling installation; steel support frames or counter supports are equipped for hangers longer than 1.5m to enhance the stability of the suspension system.

4. Application Scope

This lay-in ceiling system is designed for suspended ceiling applications in commercial and public buildings where easy access to overhead services is required. Typical applications include:

- Office Buildings: Open-plan and private office ceilings requiring acoustic control
- Retail & Commercial: Shopping malls, retail stores, and showroom ceilings
- Healthcare: Hospital corridors, patient rooms, and clean-room environments
- Education: Classrooms, libraries, lecture halls, and campus buildings
- Transportation: Airport terminals, metro stations, and railway concourses

5. Compliance Standards

- **JG/T 450: Steel and Aluminum Ceiling Systems**
- **GB/T 23444: Metal and Metal Composite Ceilings**

- **GB/T3190-2020: Chemical Composition of Wrought Aluminum and Aluminum Alloys**
- **GB/T3880: Aluminium and Aluminium Alloy Plates and Sheets for General Industrial Use**
- **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**
- **ISO 354: Acoustics - Measurement of Sound Absorption in a Reverberation Room**

6. Packaging & Storage

Packaging: Each panel is interleaved with PE protective film, then packed in custom wooden crates with foam padding at corners and edges. Panels are stacked horizontally with cardboard separators between layers. Grid components are bundled separately in steel-strapped packs or cartons.

Storage: · Store in a dry, ventilated, and rainproof warehouse. Avoid direct sunlight, high temperature (>70°C), and high humidity (RH>85%).

- Avoid contact with sharp objects, chemicals, and corrosive substances.
- Stacking height shall not exceed 1.5 meters to prevent panel deformation.
- Storage area shall meet fire safety requirements for Class A non-combustible materials.

7. Quality Assurance

All panels and grid components undergo multi-stage quality inspection before delivery, including dimensional tolerance verification, thickness measurement, coating adhesion test (cross-cut per ASTM D3359), color difference measurement, and flatness check.

Acoustic panels are tested for NRC per ISO 354.

Ballesta provides a 15-year warranty against manufacturing defects under normal use conditions. PVDF-finished panels carry an additional 5-year color and gloss retention warranty (25-year total).
