Deiiang

Cleanroom Equipment Manufacturing

12 m × 6 m × 2.5 m
ISO 6 Modular Cleanroom Solution

40×40 industrial aluminum profile | Transparent PMMA wall panels | 16 FFU ceiling supply
Double-person twin-blast air shower | Mechanical interlock pass box | Class 1,000 (ISO 14644-1 Class 6)

- ✓ 120 air changes/h, verified to meet ISO 6 at rest
- ✓ Air shower for personnel + pass box for materials, dual-zone design
- ✓ 20 working days lead time, 5 days on-site installation

Deiiang Company | Technical Proposal V2.0 | October 2026

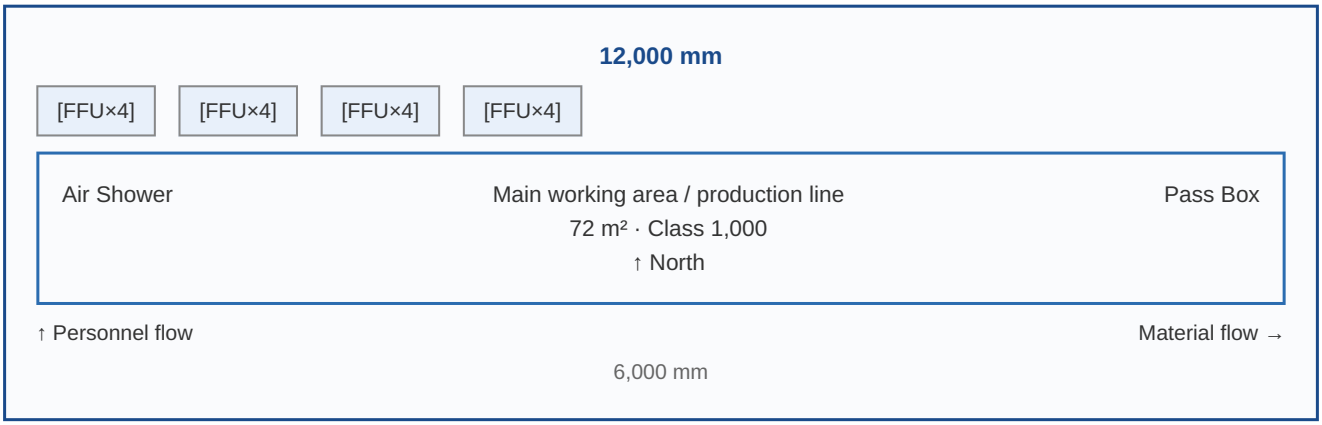
Project dimensions: 12,000 × 6,000 × 2,500 mm | Area 72 m² | Volume 180 m³

1. Design Inputs & Targets

Overall dimensions	L 12,000 mm × W 6,000 mm × H 2,500 mm
Clear internal dimensions	≈ 11,800 × 5,800 × 2,350 mm (aluminum frame + ceiling)
Area / Volume	72 m² / 180 m³
Cleanliness class	**ISO 14644-1 Class 6 (Class 1,000)**, at-rest condition
Suspended particle limit	≥ 0.5 µm particles ≤ 352,000/m³; ≥ 5 µm particles ≤ 2,930/m³
Temperature / Humidity	22 ± 2 °C / 50 ± 10 % RH (relies on facility HVAC)
Pressure differential	+10 ~ +15 Pa relative to external corridor
Noise	≤ 62 dB(A) at working plane center
Illuminance	≥ 300 lux at working plane

2. Layout & Personnel / Material Flow

The cleanroom runs along the 12 m long axis. Personnel enter from the short-side corridor through the **air shower** before entering the main working area; materials enter from the adjacent short side via the **pass box**, fully separated from personnel flow to avoid cross-contamination.



Air shower: mounted on the corridor side; personnel are blown clean before entering. Pass box: positioned at the material staging side; mechanically interlocked, both doors cannot open simultaneously.

3. FFU Count & Airflow Calculation

Item	Value	Calculation note
Room volume	180 m³	12 × 6 × 2.5
Target air change rate	120 ACH (ISO 6 mid-range)	ISO 6 range 90–150 ACH, mid-point chosen for margin
Required total supply airflow	21,600 m³/h	180 × 120
FFU size	1,175 × 1,175 mm	H14 HEPA + EC backward-curved fan
Per-unit effective airflow	≈ 1,490 m³/h	0.4 m/s × 1.38 m² × 3,600 s × 75% (HEPA resistance correction)
Number of FFUs	16 units	21,600 ÷ 1,490 ≈ 14.5, rounded up to 16

HEPA coverage ratio	30.7%	16 × 1.38 m² ÷ 72 m² (ISO 6 typical 25–40%)
Actual air change rate	≈ 132 ACH	16 × 1,490 ÷ 180, with 10% margin for filter loading

Airflow organization

- **Top supply, side return:** 16 FFUs evenly distributed in the ceiling grid (4 columns × 4 rows), discharging vertical unidirectional airflow over the working plane.
- **Return air:** 400 mm high return grilles at the lower wall section (G4 pre-filter), ducted back to FFU inlet for recirculation.
- **Positive pressure:** maintained at +10–15 Pa by balancing the return air damper; excess air leaks out through air shower gaps and pass box clearances to the corridor.
- **Personnel dust control:** operators remain downstream of FFU supply airflow; generated particles do not drift across product.

4. Personnel Airlock: Double-Person Twin-Blast Air Shower

Model	Deiias-AS-1200 double-person twin-blast
External dimensions	1,200 W × 1,000 D × 2,180 H mm
Internal dimensions	900 W × 900 D × 1,950 H mm
Nozzles	6 per side, 12 adjustable SUS304 stainless steel nozzles
Jet velocity	20–22 m/s at nozzle outlet
Filters	G4 pre-filter + H13 HEPA (≥ 99.95% @ 0.3 μm)
Fan	1.1 kW, airflow 1,200 m³/h
Blast duration	0–99 s adjustable, factory set to 15 s
Interlock	Electronic dual-door interlock; both doors locked during blow-off, exit side unlocks at completion
Body material	External: cold-rolled steel powder-coated / Internal: SUS304 stainless
Optional	Automatic door, voice prompt, infrared-sensed blow-off

5. Material Airlock: Mechanical Interlock Pass Box

Model	Deiias-PB-600 standard mechanical interlock
External dimensions	750 W × 600 D × 650 H mm
Internal dimensions	600 W × 600 D × 600 H mm
Interlock type	Mechanical-electromagnetic interlock; both doors cannot open simultaneously
Interior material	SUS304 stainless steel, rounded corners for easy cleaning
Standard features	Recessed fluorescent light, electronic interlock indicator, push-button door release
Optional	HEPA self-purifying pass box (ISO 5 internally), UV sterilizing lamp

Selection note: For materials entering at medium frequency, the standard mechanical interlock is sufficient. If materials are unpackaged or exposed in an ISO 7 corridor, upgrading to a self-purifying pass box (with mini FFU maintaining ISO 5 internally) is recommended at an additional cost of approximately ¥3,500/unit.

6. Main Material System

6.1 Framework: 40×40 Industrial Aluminum Profile

Profile	40×40 mm European standard slot 8, 6063-T5, anodized film ≥ 10 μm
Uprights	Every 2 m along the 12 m long side; 8 uprights + 4 corner reinforcements
Cross-beam reinforcement	Additional 2 pcs 40×80 spliced connector beams mid-span along the 12 m side to prevent FFU sagging
Connections	Internal corner brackets + dedicated connectors; no welding
Surface resistance	Anti-static anodized (10^6–10^9 Ω), required for electronics workshops

6.2 Enclosure: Transparent PMMA Panels

Side walls	5 mm transparent PMMA, slotted into EPDM sealing gasket
View windows	3 mm transparent PMMA, flush-mounted into wall for external observation
Door	8 mm PMMA hinged door, 1 leaf (matches air shower connection)
Light transmission	≥ 92%; anti-static coating optional

6.3 Ceiling & Lighting

- **Ceiling panels:** 50 mm thick cold-rolled steel powder-coated, surface resistance 10^6 Ω, 16 FFU openings installed.
- **Luminaires:** 300×1200 mm recessed LED cleanroom lights, 48 W each, 8 units; working-plane illuminance ≥ 300 lux.

7. Project Schedule & Installation

Engineering to factory delivery	15–20 working days
On-site installation	3 technicians × 5 days
Post-installation self-cleaning	24 hours
Third-party testing	1 day (customer-designated agency)

8. Acceptance Criteria

The cleanroom acceptance shall be carried out in accordance with the following referenced standards and test methods:

Test item	Acceptance basis / method	Pass criterion
Airborne particle count	ISO 14644-3, at-rest condition, 3 consecutive sampling passes	≤ 352,000/m³ @ ≥0.5 μm; ≤ 2,930/m³ @ ≥5 μm
HEPA filter leak test	PAO (DOP) aerosol scanning per IEST-RP-CC034 / EN 1822	No leak penetration exceeding 0.01% at any filter seal or medium
Pressure differential	Digital manometer, room-to-corridor measurement	+10 to +15 Pa between cleanroom and external corridor

Air shower velocity	Anemometer at nozzle outlet	20–22 m/s
Interlock function	Operational check of both doors	Dual-door interlock verified; both doors cannot open simultaneously
Illuminance	Lux meter at working plane, grid sampling	≥ 300 lux average
Noise level	Sound level meter at working plane center	≤ 62 dB(A)

Third-party testing: Independent certification may be commissioned through **SGS** or **TÜV** (or other customer-designated accredited laboratory). The third-party test report shall be handed over to the customer upon successful completion. Deiiang provides on-site coordination and access support for third-party testing.

9. Warranty

Warranty terms (from commissioning acceptance date):

- Wall / ceiling panel system (aluminum framework + PMMA panels) — **5 years**
- HEPA filter media — **3 years**
- FFU EC fan motor — **5 years**
- Air shower fan & electronic interlock — 2 years
- PMMA transparent panels — 2 years

Warranty covers manufacturing defects in materials and workmanship. Consumable items (pre-filters, gaskets, lamps) are excluded. On-site repair or replacement of defective parts shall be provided free of charge during the warranty period, excluding freight and customs for overseas sites.