

YUFENG

TA Series Fully Automatic Cake Production Line Planning Proposal

全自动蛋糕生产线规划方案

- ◆ Not just equipment, but a complete implementation solution of process + space + workflow
- ◆ Project Type: Whole Line Planning for Food Factory

YUFENG
COMPLETE BAKERY AUTOMATION SOLUTION

Four Major Functional Zones

Project Overview

Raw Material Storage Area & Production Preparation Area

Production Area

Cooling Area
Primary Packaging Area
Cold Processing Area

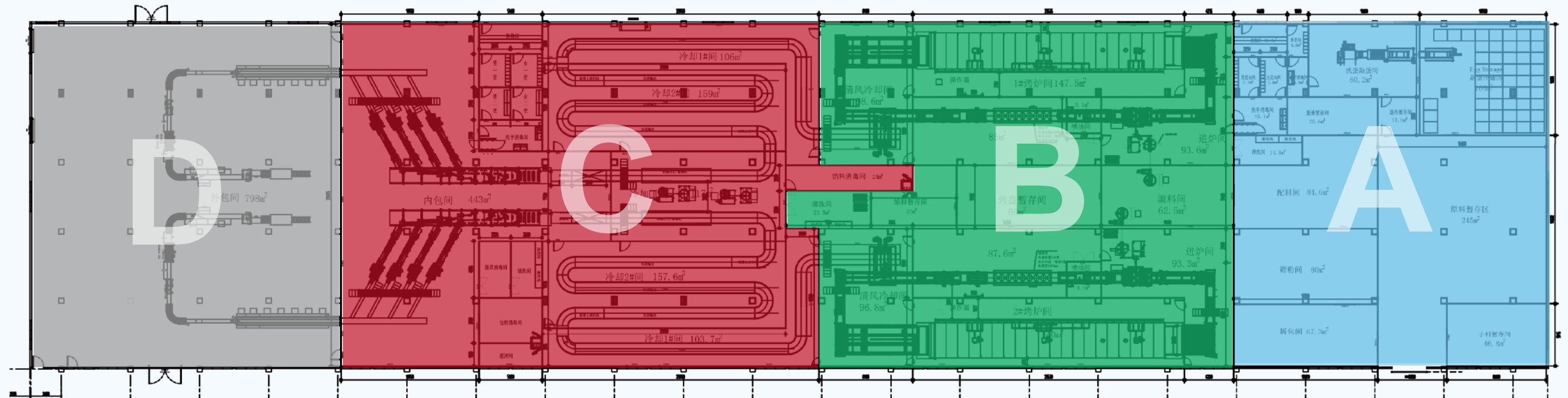
Full-Process Delivery Solution

Zone A **Raw Material Storage & Preparation Area**

Zone B **Production Area (including Production Preparation Area)**

Zone C **100,000-Class High Cleanliness Area**

Zone D Secondary Packaging Area



Project Overview

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Full-Process
Delivery Solution



Four Major Functional Zones

Zone A

Raw Material Storage & Preparation Area

Raw Material Temporary Storage Area: External materials such as flour, sugar, oil, and auxiliary materials are temporarily stored after entry.

Minor Ingredient Temporary Storage Room: Sorted storage for small-batch auxiliary materials.

Egg Cold Storage Room: Refrigerated temporary storage at 15~18°C.

Unpacking Room: Removing outer packaging; materials cannot enter the inner workshop directly.

Flour Sifting Room: Sifting treatment for flour.

Batching Room: Weighing and batching according to recipe.

Zone B

Production Area

Mixing Room: Mixing and blending of raw materials.

Aeration Room: Batter aeration and whipping.

Oil Spraying Room: Spraying demolding oil on baking trays.

Depositing Room: Automatic depositing and forming.

Oven Room: Baking at 180-200°C.

Forced Air Cooling, Depanning, Washing, Baking Tray Storage Tower.

Zone C

100,000-Class High Cleanliness Area

Cooling Area: 100,000-class cleanliness.

Cold Processing Area: Reserved for future core-injection equipment.

Primary Packaging Area: Sterilization → Metal Detection → Sorting and Packaging.

Environmental Control: 22±2°C, 50~55% RH.

Air Changes: 23-38 times/h.

Zone D

Secondary Packaging Area

Secondary Packaging Room: Outer packaging for finished products.

Finished Product Outbound: Logistics and shipping.

Normal Area Environment: 26~28°C.

No cleanliness class requirement.

Main Logistics Line Process Overview

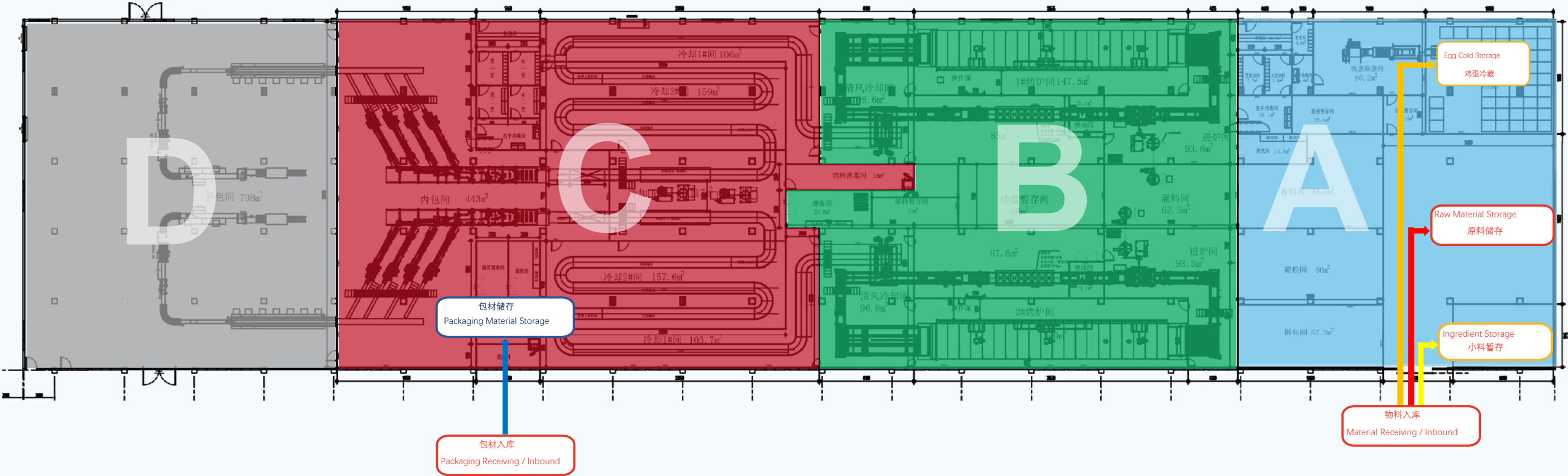
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Main Logistics Line Process Overview

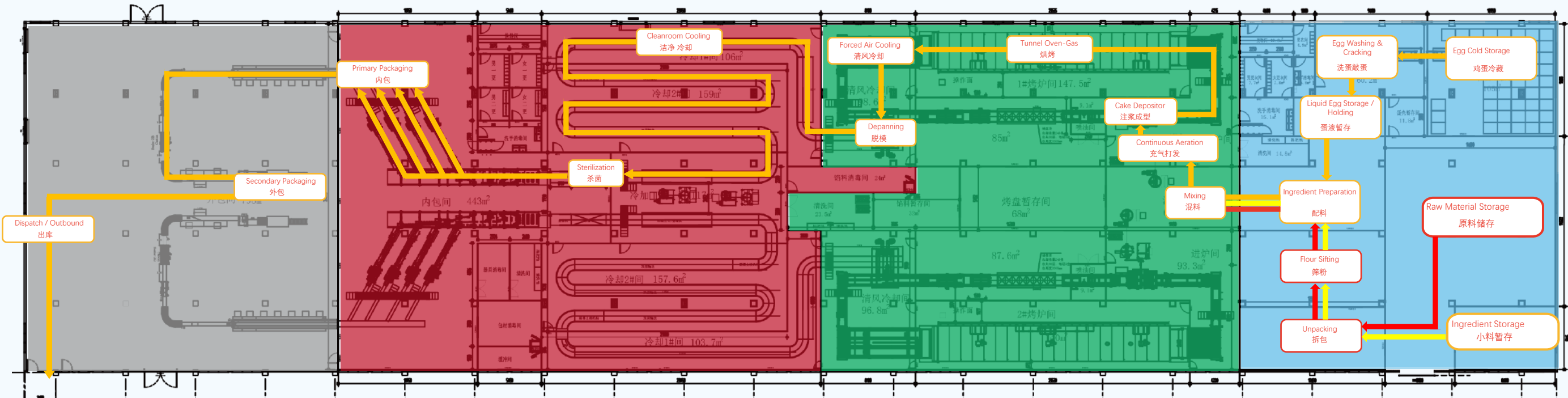
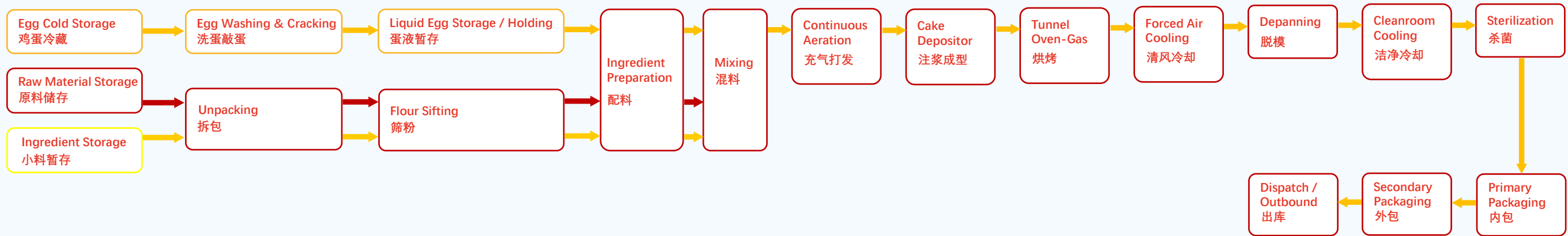
Project Overview

Raw Material Storage
Area & Production
Preparation Area

Production Area

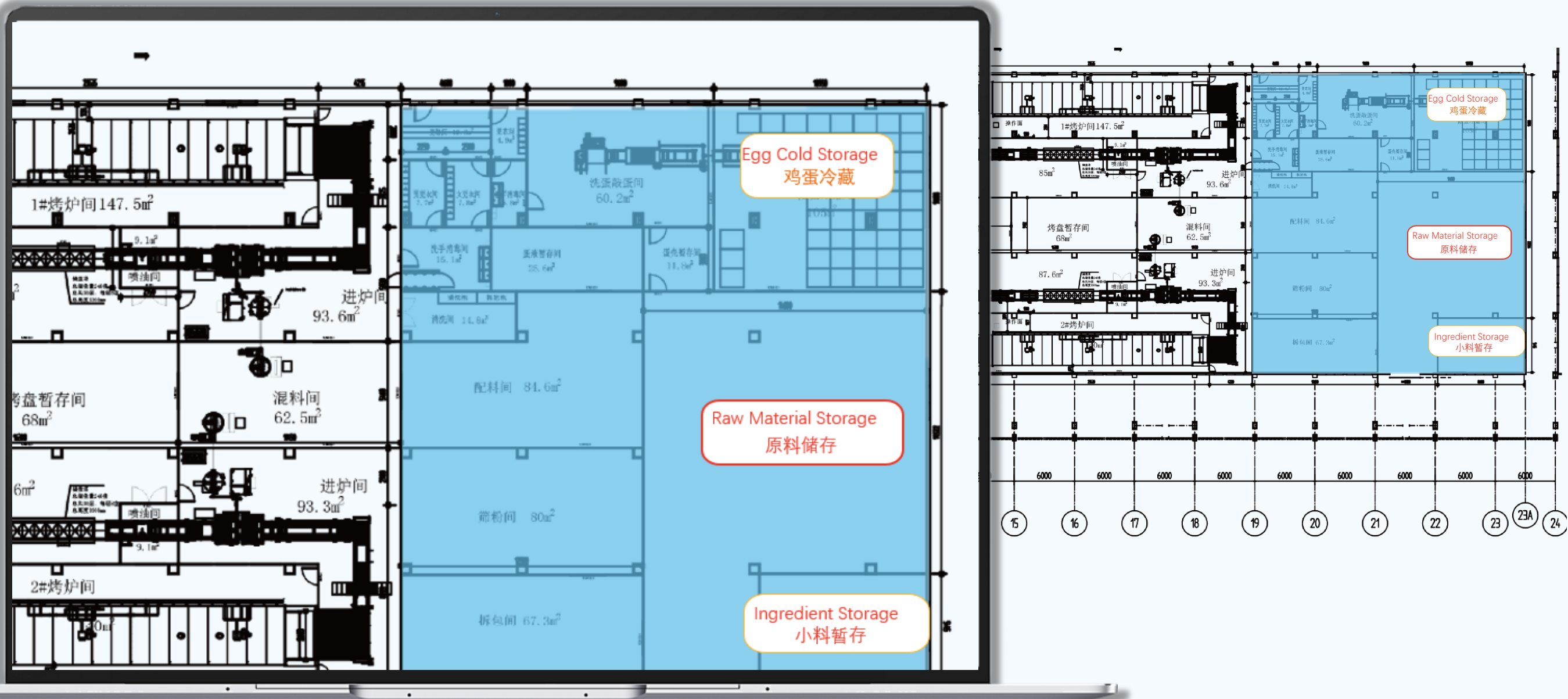
Cooling Area
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Full-Process
Delivery Solution



Logistics Node ① · Raw Material Storage & Temporary Storage

- ◆ Raw Material Temporary Storage Area + Minor Ingredient Temporary Storage Room: External materials such as flour, sugar, oil, and auxiliary materials are temporarily stored after entry.
Egg Cold Storage Room: Eggs are temporarily stored under refrigeration at 15~18°C.
Key Concept: This is not batch-type material preparation, but continuous turnover feeding; temporary storage lasts only a few hours to half a day.



Project Overview

Raw Material Storage
Area & Production
Preparation Area

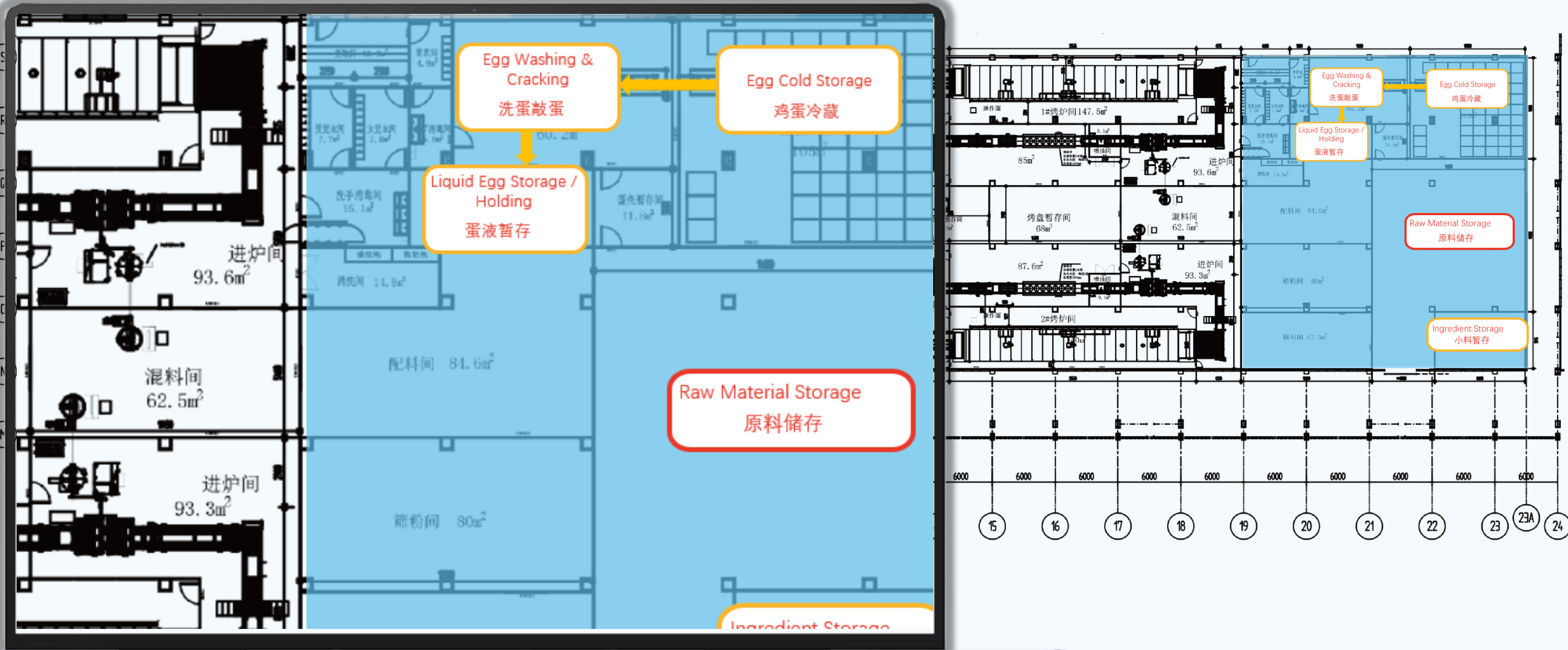
Production Area

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Full-Process
Delivery Solution

Logistics Node ② · Liquid Egg Processing Center

- ◆ Process: Eggs go from Cold Storage Room → Egg Washing & Cracking Room → Liquid Egg Temporary Storage Room.
Eggs poured into disinfection pool → Automatic washing → Automatic egg breaking (egg shells are temporarily stored centrally and taken out from inside) → Liquid egg is quantitatively delivered to the mixing room via a pumping system.
Equipment: Egg washing machine, egg breaking machine, low-temperature liquid storage tank.



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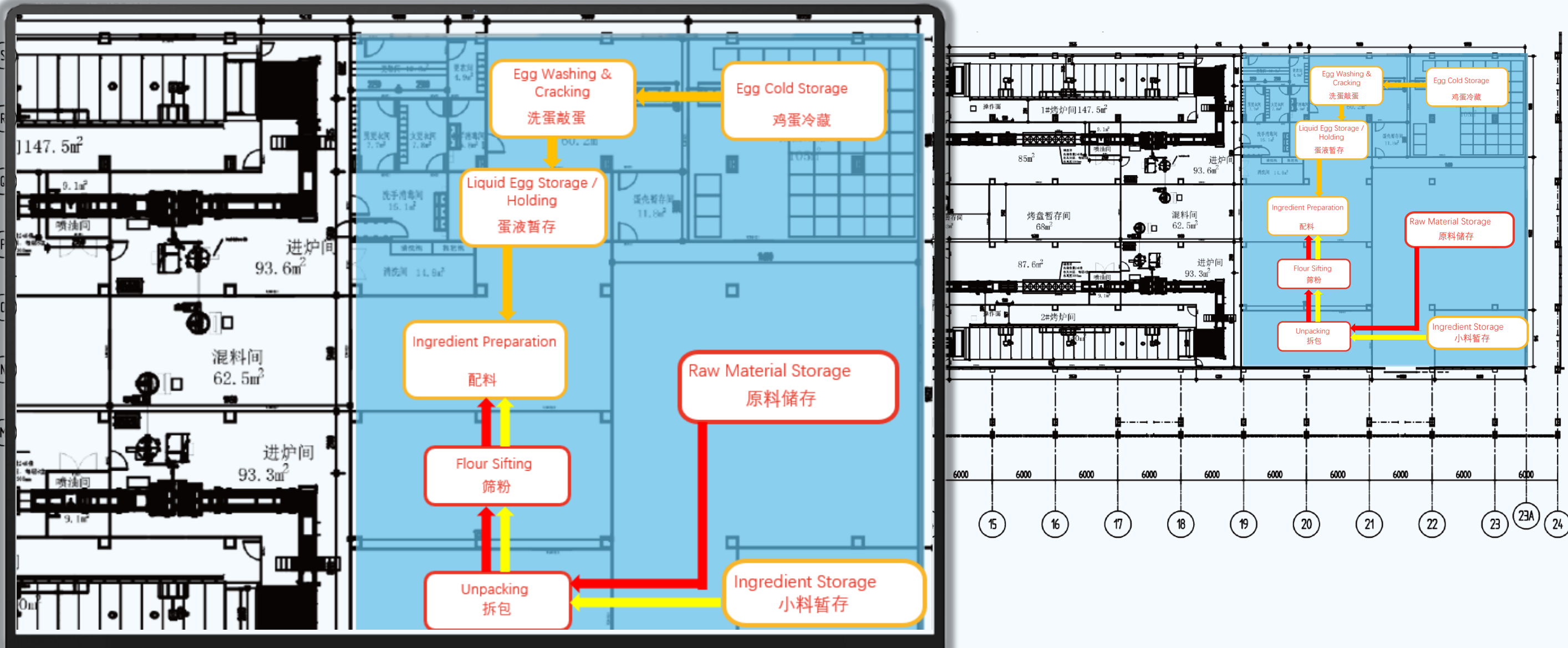
Full-Process
Delivery Solution

Logistics Node ③ · Unpacking, Flour Sifting & Batching

◆ Unpacking Room: Materials enter with boxes/bags, outer packaging is removed, materials cannot enter the inner workshop directly, transported after unpacking.

Flour Sifting Room: Flour needs sifting; sugar, oil, and minor ingredients do not need sifting and go directly to batching.

Batching Room: Weighed according to the recipe, flour + sugar + oil + egg + minor ingredients form the exact amount for a one-time feed; a door connects directly to the mixing room.



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-
- The schematic diagram illustrates the layout of the egg powder production workshop, divided into a green production area and a blue storage area. The production area (left) contains 1# and 2# baking ovens, a mixing area, continuous aeration, and ingredient preparation. The storage area (right) includes egg washing/cracking, liquid egg storage, ingredient storage, and raw material storage. A central flowchart details the process: Unpacking (拆包) → Flour Sifting (筛粉) → Ingredient Preparation (配料) → Mixing (混料) → Continuous Aeration (充气打发) → Liquid Egg Storage / Holding (蛋液暂存) → Egg Washing & Cracking (洗蛋敲蛋). A coordinate grid at the bottom shows columns 14 to 24 and rows M to S.

Logistics Node ⑤ · Forming and Baking

Project Overview

Raw Material Storage Area & Production Preparation Area

Production Area

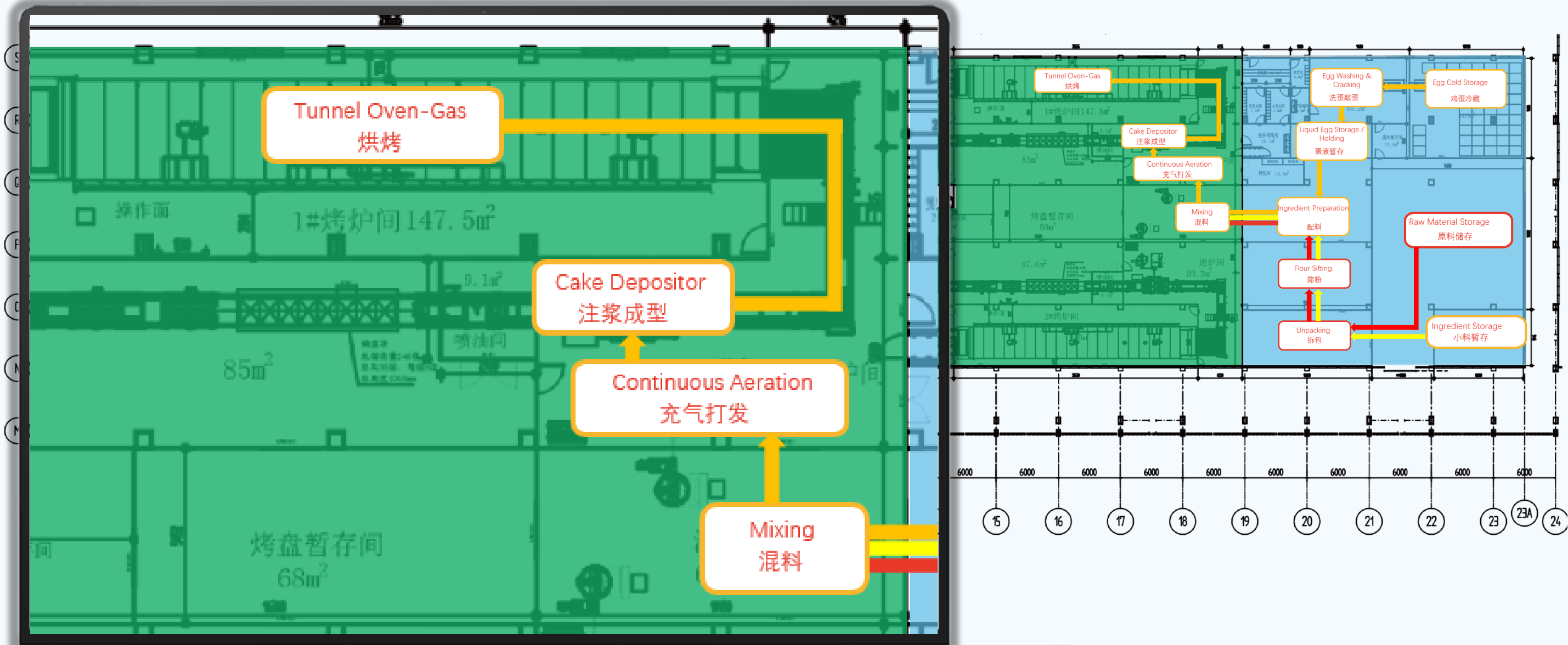
Cooling Area
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Full-Process
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- ◆ Baking tray circulation supply → Oil Spraying Room (independent strong exhaust to prevent oil/gas accumulation) → Depositing (automatic forming) → Oven Entry Room.

Oil Spraying: Spraying oil on mold trays; Depositing: Automatic forming.

Equipment: Oil sprayer, cake depositor.



Logistics Node ⑤ · Forming and Baking

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Full-Process
Delivery Solution

4m

Floor Height

180~200

Baking Temperature (°C)

50~53

Air Changes (times/h)

Class A

Fire Resistance Rating

Detailed Configuration of Oven Room:

Wall Panel Material: Single-sided stainless steel magnesium oxysulfide color steel sandwich partition wall, Class A fire protection standard.

Lighting Configuration: Explosion-proof lights configured to ensure safety.

Detachable Design: The side wall below 1.6 meters is detachable/movable to facilitate later equipment maintenance.

Ventilation System: High-temperature resistant 80°C exhaust system, 50~53 air changes/h.

Special Floor Height: The oven room has a floor height of 4 meters to meet the needs of oven equipment and heat dissipation space.



Logistics Node ⑥ · Forced Air Cooling (Process Principle)

Project Overview

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Full-Process
Delivery Solution

Problem

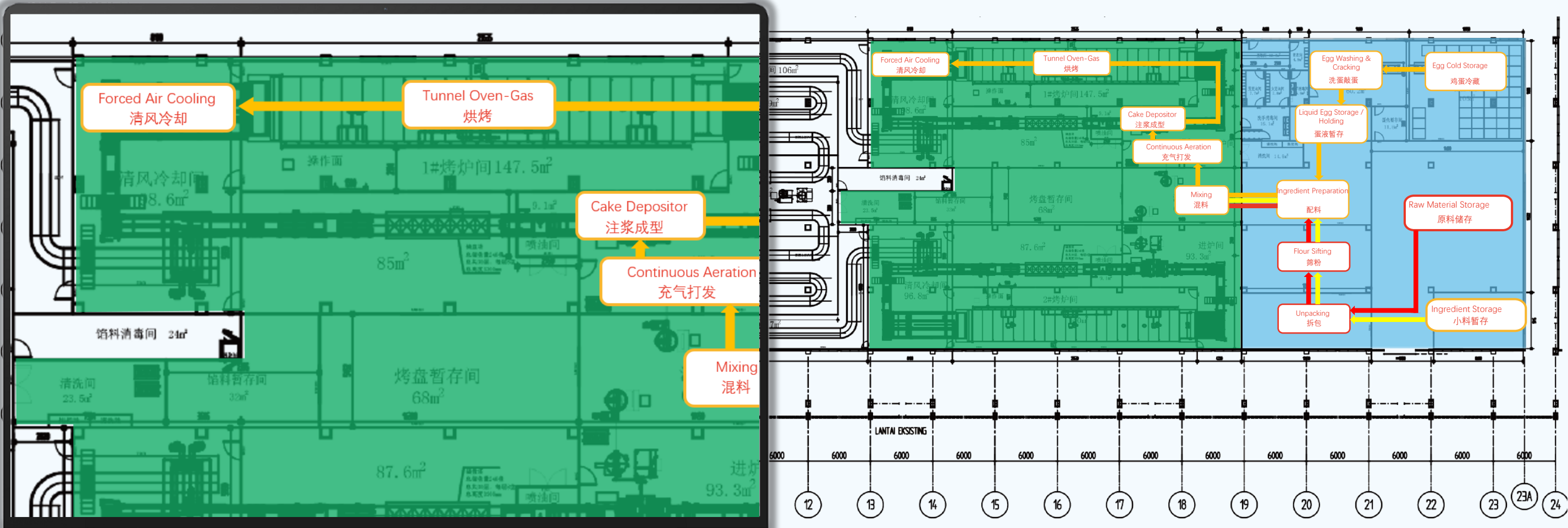
Why can't cold air be used directly for cooling?

Products right out of the oven have extremely high temperatures and contain a lot of water vapor. If cold air or a PU conveyor belt is used directly: water vapor gets "trapped" inside the cake and cannot dissipate → affecting taste and shelf life.

Solution

Forced Air Cooling System.

Filtered natural air + B-link conveyor belt (breathable), allowing water vapor to dissipate naturally. It switches to a PU conveyor belt only after entering the cooling room.



Logistics Node ⑧ · 100,000-Class Cleanroom Cooling

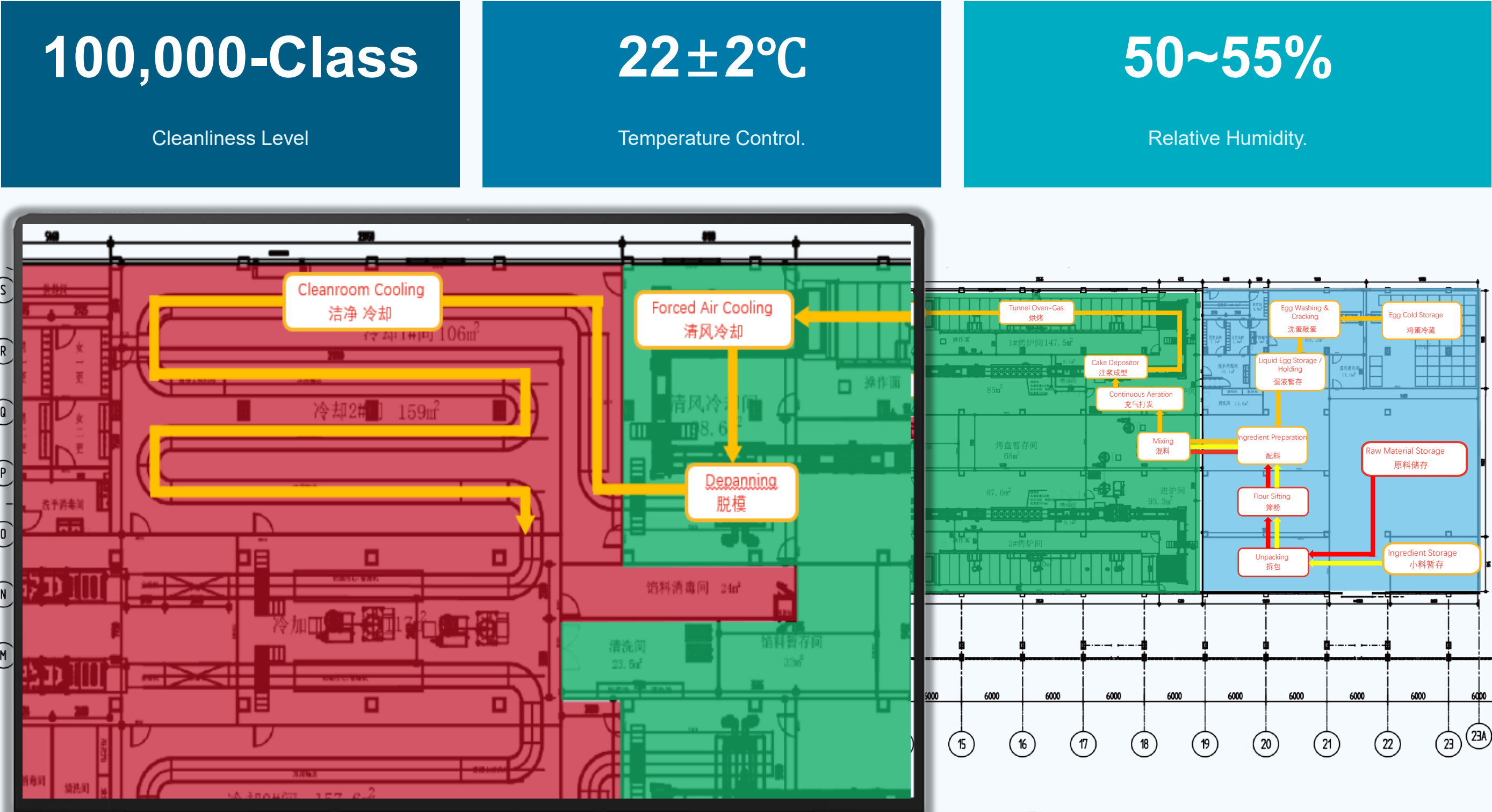
Project Overview

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Logistics Node ⑧ · 100,000-Class Cleanroom Cooling

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Delivery Solution



Functions and Safeguard Measures:

- Products cool slowly to room temperature in a constant temperature and humidity clean environment, ensuring stable quality.
- Air Handling Unit (AHU): Primary and medium-efficiency filtration, continuously providing clean air.
- UV Lamp Layout: Regular sterilization to control microbial content in the air.
- Ozone Coverage: Regular disinfection to ensure the high cleanliness environment continuously meets standards.

Logistics Node ⑧ · 100,000-Class Cleanroom Cooling

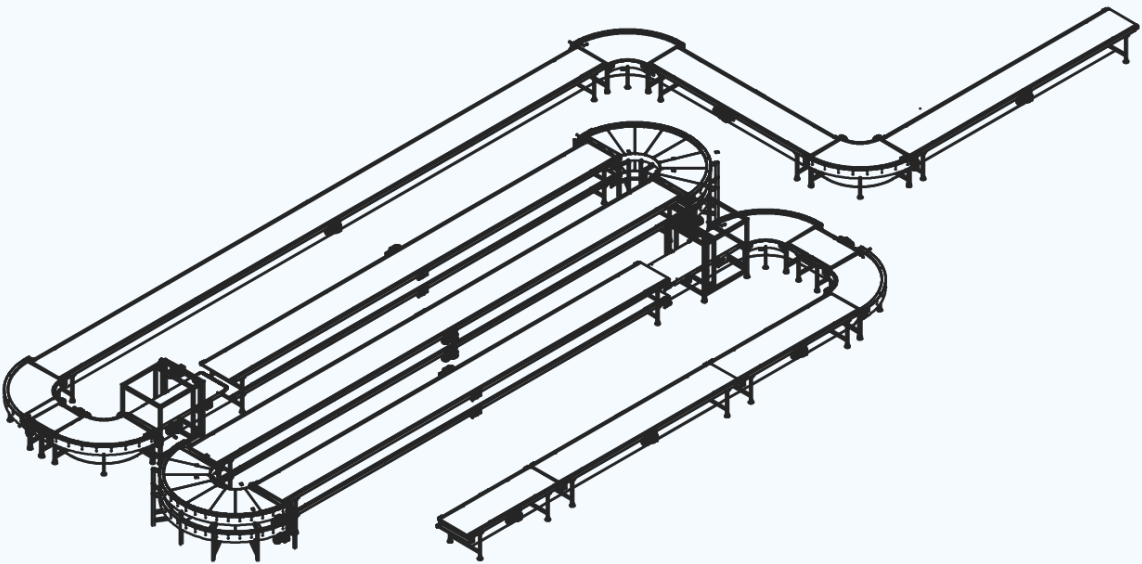
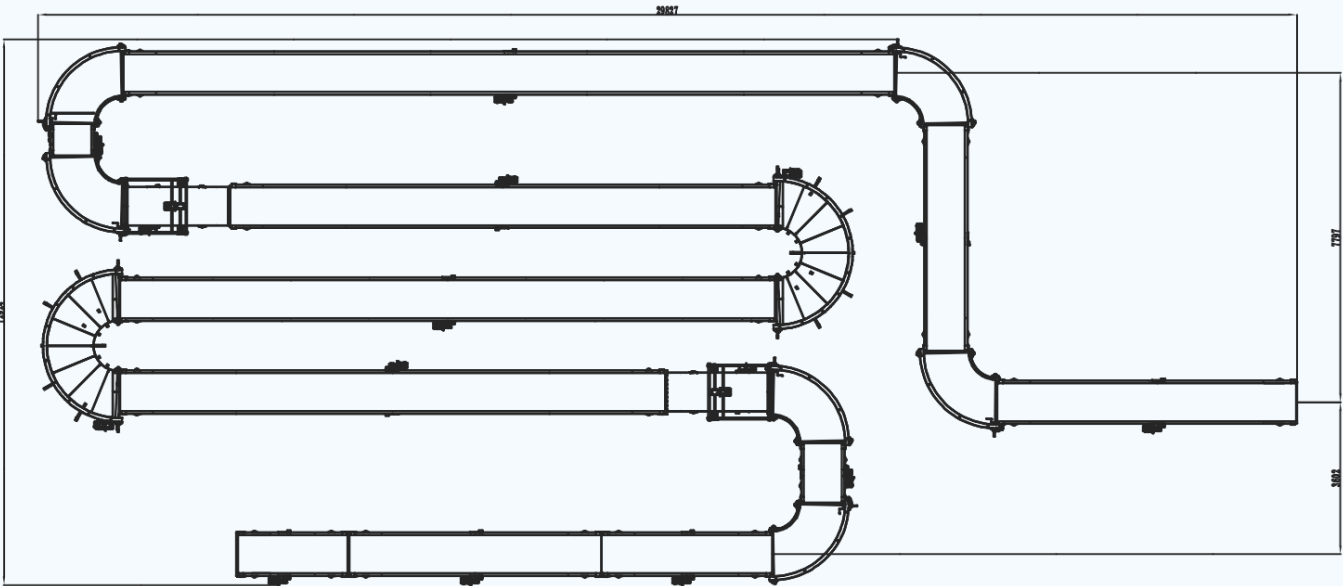
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Full-Process
Delivery Solution



直线输送带长度134.4米，不包含90度和180度转弯输送机，冷却时间可以达到25分钟，产品可以得到充分的冷却。产品刚刚脱模出来，热量比较高，需要使用乙型网链，蛋糕底部透气，可以使产品的水分散发出来

The straight conveyor is 134.4 meters long, excluding 90-degree and 180-degree turning conveyors. The cooling time can reach 25 minutes, ensuring the product is fully cooled. The product is just depanned with relatively high temperature. Type B mesh chain is required for conveying. The breathable bottom of the cake allows internal moisture to dissipate quickly.

Logistics Node ⑨ · Reserved Cold Processing & Instant Sterilization Machine

Project Overview

Raw Material Storage Area & Production Preparation Area

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Cooling Area
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Cold Processing Area

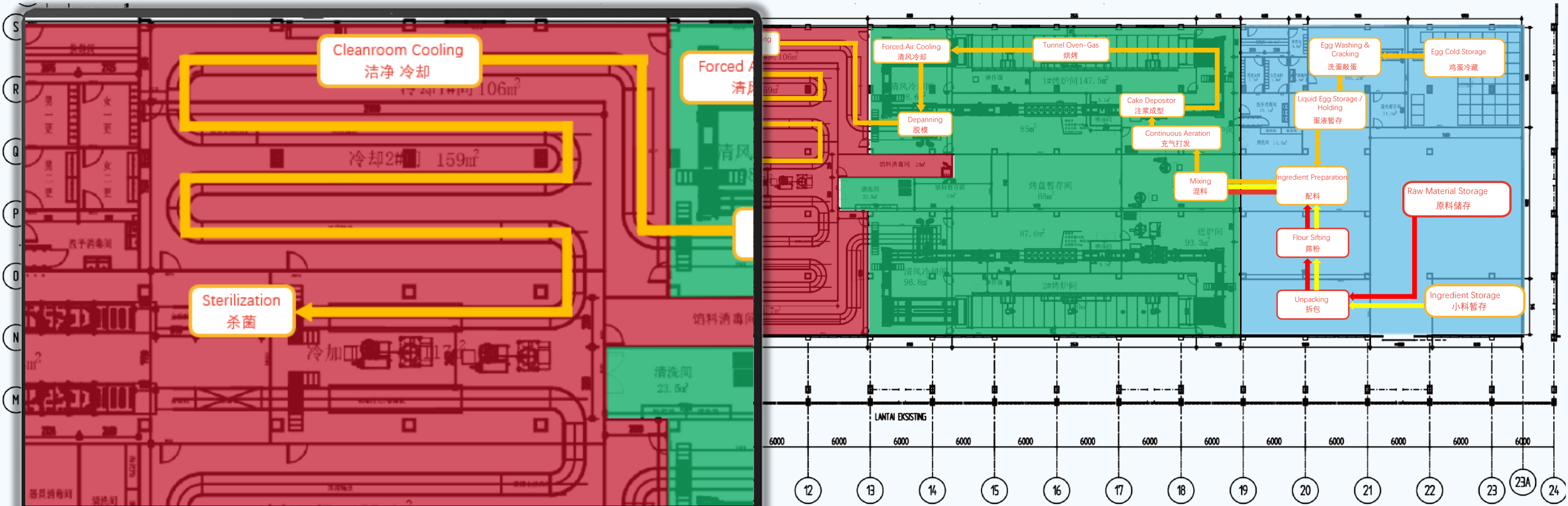
Full-Process
Delivery Solution

Cold Processing Reserved Area

Cold Processing + Filling Disinfection Room (100,000-Class).

Currently a conveyor belt channel, reserved for future core-injection equipment.
Materials enter through the side door of the mixing room → Filling temporary storage → Disinfection → Core injection.
The grinding plate temporary storage area is also near this area (buffer standby).

- ◆ Why is secondary sterilization needed? Although the high cleanliness area has UV + ozone environmental disinfection, future cold processing involves human contact with products, requiring another strong sterilization to ensure product safety.
- ◆ Metal Detector: Passes through a metal detector after sterilization to ensure no metal foreign objects in the product, guaranteeing food safety.



Logistics Node ⑨ · Reserved Cold Processing & Instant Sterilization Machine

Key Equipment

Four core technologies of the tunnel-type instant sterilization machine (99.9% sterilization rate).

Pulsed Intense Light:
Destroys DNA/RNA,
killing stubborn
bacteria.

Plasma: Penetrates
cell membranes,
broad-spectrum with
no dead ends.

Electrostatic Ions:
Ruptures cell membranes,
enhancing sterilization.

Negative Ions: Inhibits
reproduction, assisting
in preservation.

Location: Cooling room exit → Before packaging.

检验结果				
序号	检验项目	试验要求	测试结果-说明	判定
1	外壳材质	采用 304 不锈钢材质，厚度 ≥1.2mm	304 不锈钢，实测厚度 1.5mm	合格
2	表面质量	表面光滑平整，无毛刺、裂纹、变形，焊缝均匀牢固	表面光滑，无缺陷，焊缝平整	合格
3	结构完整性	各部件连接牢固，无松动；门体密封良好，无泄漏	连接牢固，密封性能良好	合格
4	控制系统	触摸屏显示清晰，操作灵敏；急停按钮功能正常	显示清晰，操作灵敏，急停有效	合格
5	输送带	304 不锈钢乙型网带，网孔均匀，运行平稳，无跑偏、卡滞	304 不锈钢乙型网带，网孔均匀，运行平稳	合格
6	移动装置	万向轮转动灵活，带刹车功能，刹车可靠	转动灵活，刹车有效	合格
7	接地电阻	≤0.1 Ω	0.06 Ω	合格
8	泄漏电流	≤0.75mA	0.32mA	合格
9	绝缘电阻	≥2M Ω（冷态）	15.6M Ω	合格
10	耐压试验	1500V，1min，无击穿、闪络	1500V，1min，无异常	合格
11	电源适应性	额定电压 ±10% 范围内正常工作	198V-242V，运行正常	合格
12	大肠杆菌杀灭率	≥99.9%	99.98%	合格
13	霉菌（黑曲霉）杀灭率	≥99.9%	99.94%	合格
14	菌落总数（自然菌）杀灭率	≥99.9%	99.92%	合格

15	金黄色葡萄球菌杀灭率	≥99.9%	99.96%	合格
16	输送带速度调节范围	0.1-1.0m/s	0.12-0.98m/s	合格
17	连续运行稳定性	连续运行 8h，无异常故障	连续运行 8h，运行正常	合格
18	杀菌腔温度	≤40℃（室温 25℃时）	35.8℃	合格
19	噪声	≤75dB（A）（距离设备 1m 处）	69.2dB（A）	合格
20	网带承重能力	均匀承重 ≥5kg/m²，无变形	均匀承重 6kg/m²，无变形	合格
21	开门断电保护	杀菌腔门打开时，紫外线灯立即熄灭	功能正常	合格
22	过载保护	输送带过载时，设备自动停机并报警	功能正常	合格
23	漏电保护	发生漏电时，0.1s 内自动切断电源	0.08s 切断电源	合格
24	紫外线泄漏防护	设备外 1m 处紫外线强度 ≤5 μW/cm²	2.3 μW/cm²	合格

——报告结束——



Logistics Node ⑩ · Primary Packaging and Secondary Packaging

Project Overview

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Production Area

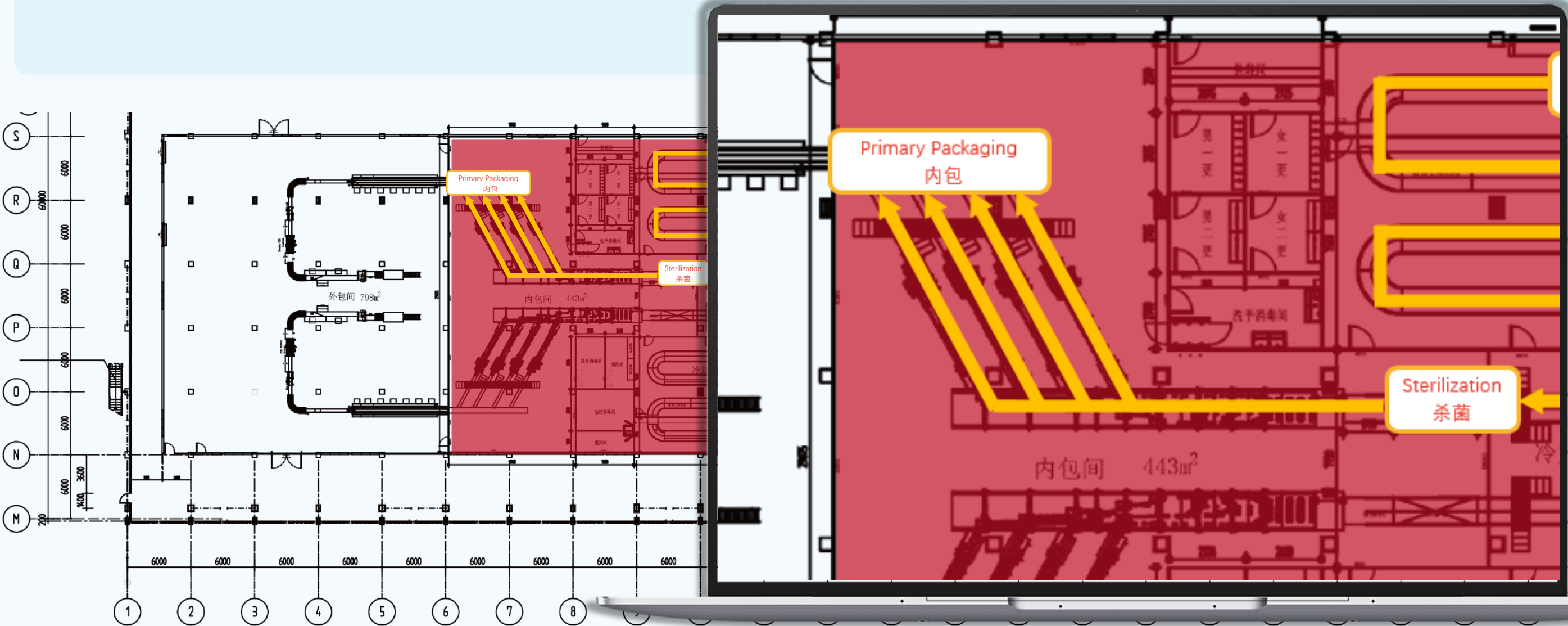
Cooling Area
Primary Packaging Area
Cold Processing Area

Full-Process
Delivery Solution

The Largest 100,000-Class Area

Primary Packaging Room.

RH / Environmental Parameters: 100,000-class, 22±2°C, 50~55% RH.
Packaging Material Management: Packaging materials must be disinfected in the packaging material disinfection room before entering.
Packaging Process: Sorting and packaging → Nitrogen-filled packaging.
Nitrogen-Filled Packaging Principle: Injecting nitrogen (inert gas) to replace oxygen, inhibit microbial growth, extend shelf life, and prevent cake molding.
Equipment: Automatic packaging machine, nitrogen generation system.



Logistics Node ⑩ · Primary Packaging and Secondary Packaging

Project Overview

Raw Material Storage Area & Production Preparation Area

Production Area

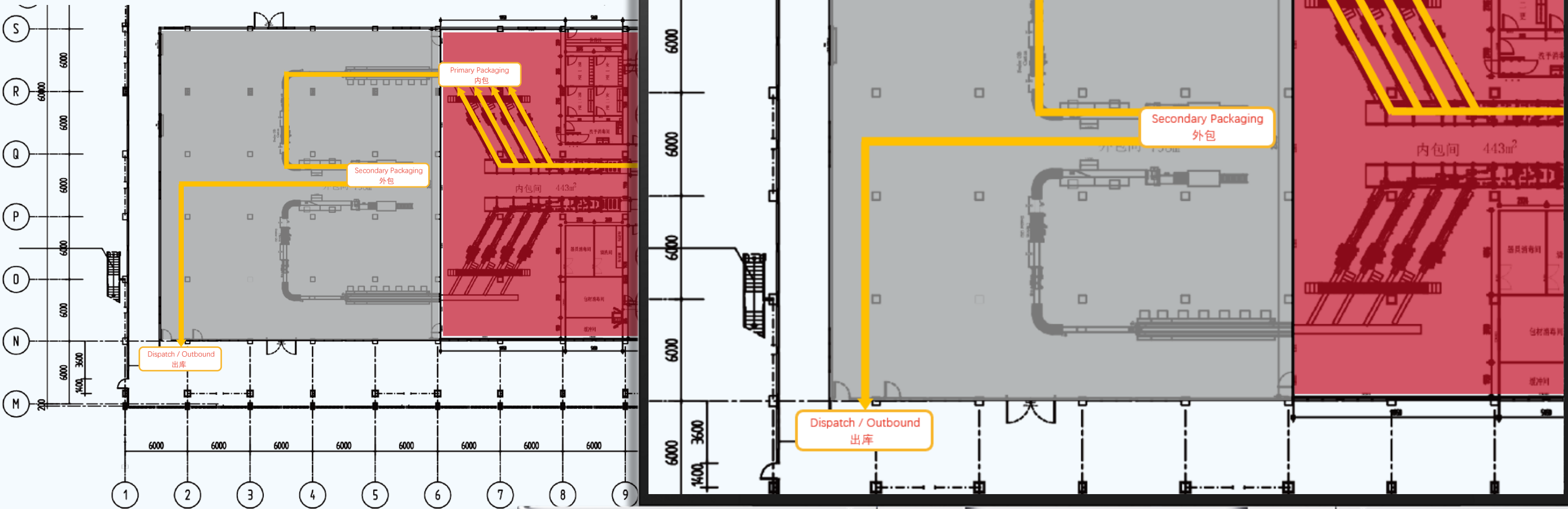
Cooling Area
Primary Packaging Area
Cold Processing Area

Full-Process
Delivery Solution

Normal Area

Secondary Packaging Room

Environmental Parameters: Normal area, 26~28°C.
Operations: Boxing, carton sealing, palletizing.
Logistics Endpoint: Finished product outbound to the warehouse.
/Equipment: Carton sealer, conveyor line.



Baking Tray Circulation Line

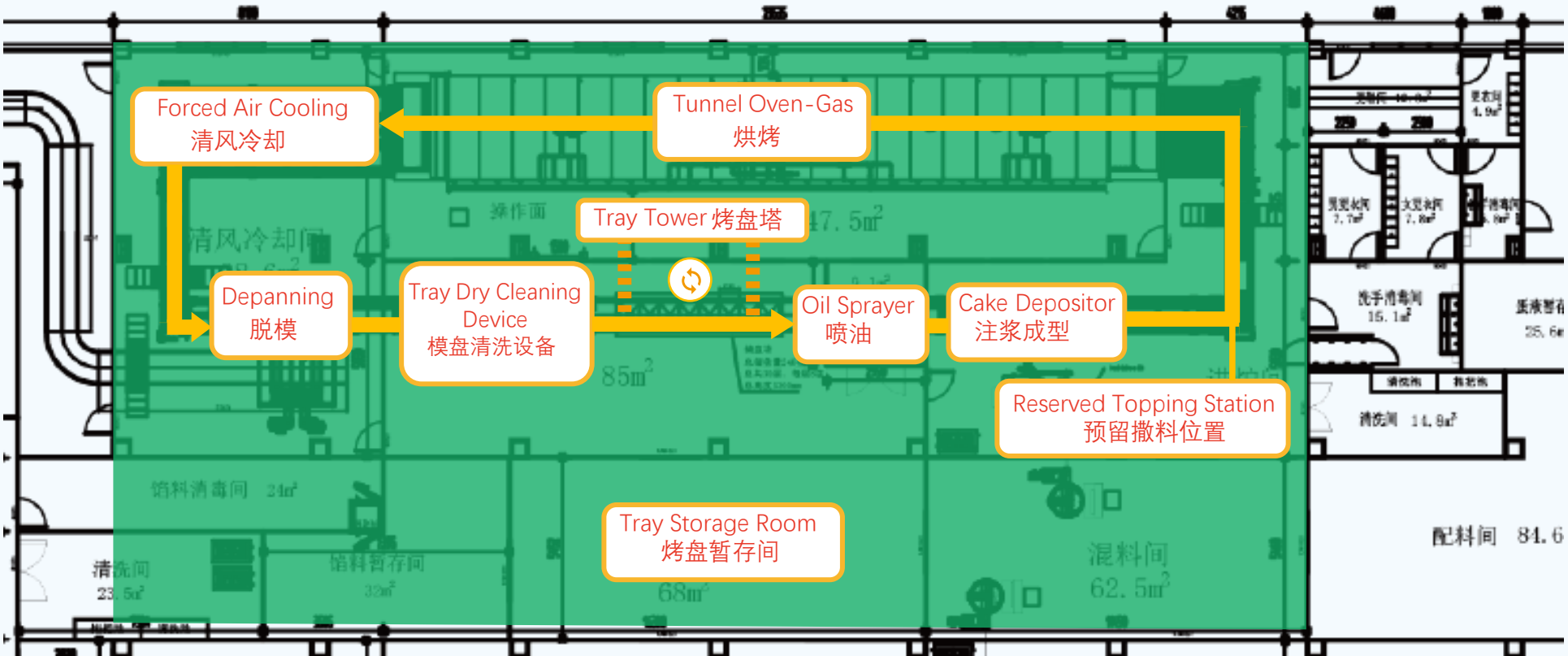
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Full-Process
Delivery
Solution



Branch A · Continuous Production

Washing → Direct circulation back to Oil Spraying Room.

Baking trays circulate directly back to the oil spraying room via conveyor belt after washing.
Continuous production mode, mold trays are always online.
No manual handling required, fully automatic circulation.
Suitable for normal production days.

Branch B · Shutdown Storage

Washing → Enters Mold Tray Storage Tower.

Washed baking trays enter the vertical storage tower.
Automatically stacked and stored layer by layer.
Suitable for shutdown or line changeover.
Saves space, easy to manage.

Baking Tray Circulation Line

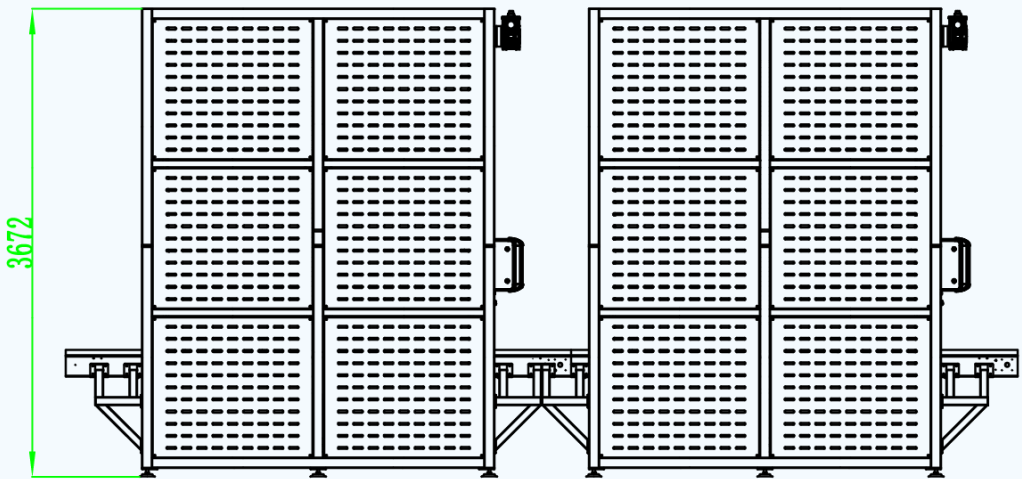
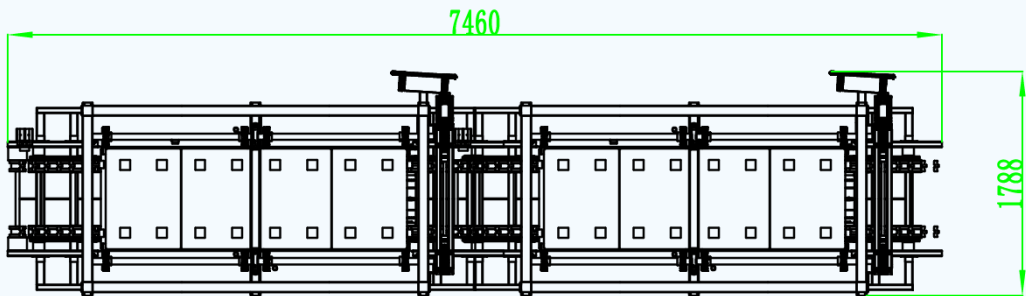
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Baking Tray Storage Tower Parameters

烤盘规格600*800mm，总存盘量256盘，总共32层，每层8盘。
储盘塔长度7460宽度1788m总高度3672mm，动力系统3套，PLC控制，总功率 6KW

Cake tray size: 600×800mm, total tray storage capacity: 256 trays, total 32 layers, 8 trays per layer.
Tray storage tower: length 7460mm, width 1788mm, overall height 3672mm; 3 sets of power system, PLC control, total power 6KW.



Personnel Routing · Entry by Zone

Normal Production Area

Front-end personnel of Zones A/B.

Entry Process:
Designated entrance → Shoe change → Primary changing room → Hand washing and disinfection → Air shower → Enter workshop (separate changing rooms for men and women)
Responsible Areas:
Raw materials, unpacking, batching, mixing, oven, etc.

High Cleanliness Area

Zone C personnel

Entry Process:
Independent entrance → Shoe change → Primary changing room → Secondary changing room → Hand washing and disinfection → Air shower → Enter.
Responsible Areas:
Cooling, sterilization, primary packaging.
Note:
Stricter standards; personnel from normal areas are strictly prohibited from entering.

Secondary Packaging Area

Zone D personnel.

Entry Process:
Independent entrance, no cleanliness requirement.
Responsible Areas:
Secondary packaging, finished product outbound.

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Zone Cleanliness Levels & HVAC Coverage

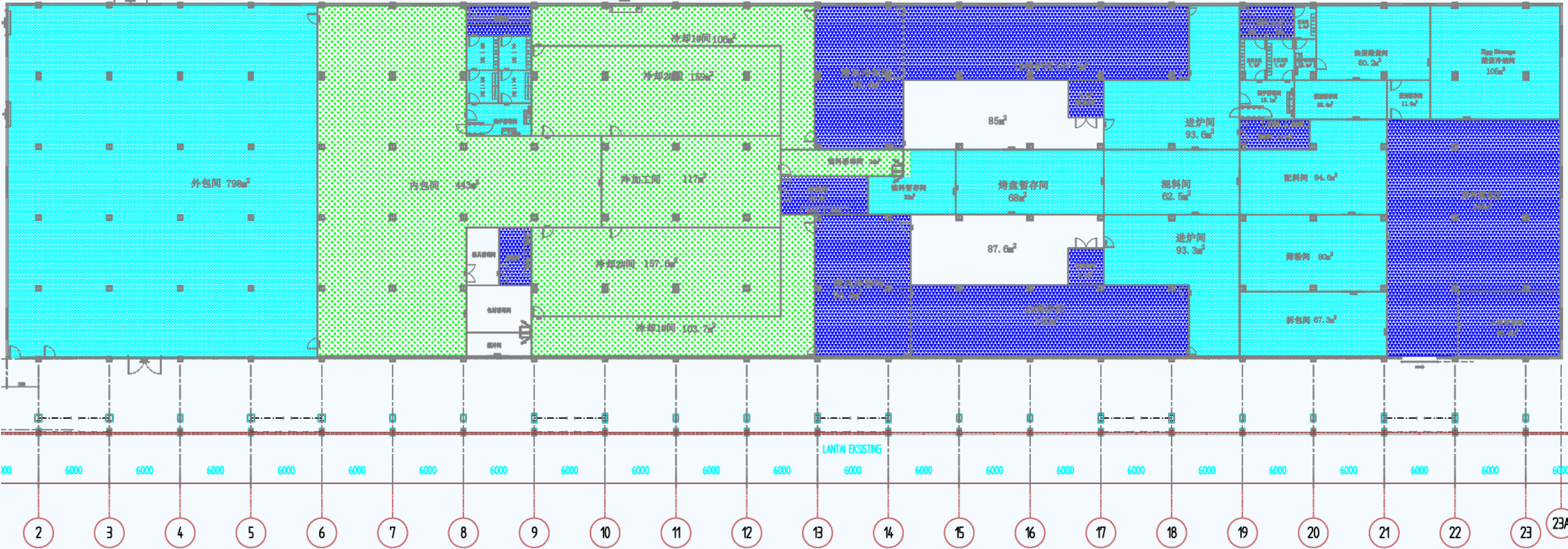
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图例及相关说明		
序号	图例及符号	名称
01		十万级净化空调区域 Class 100,000 clean air conditioning area
02		普通空调区域 Ordinary air conditioning area
03		通风区域 Ventilation area

Zone Cleanliness Levels & HVAC Coverage

Zone Type	Coverage Area	Cleanliness Level/Temperature	Special Requirements
100,000-Class Clean Area	Cooling Room, Cold Processing Room, Primary Packaging Room	100,000-Class, 22±2°C, 50~55% RH	UV + Ozone double disinfection
Normal Production Area	Front-end production area, Secondary packaging area, Auxiliary rooms	No cleanliness requirement, 26~28°C	Standard ventilation
HVAC Coverage Area	Temperature control areas	Set according to zone requirements	AHU air handling unit
Special Ventilation Area	Oven room, Oil spraying room, Forced air cooling	High temperature/high humidity exhaust	Oven 50~53 times/h, Forced air cooling 40 times/h

Note: Different zones are set with different cleanliness levels and environmental control parameters based on process requirements, ensuring product quality while optimizing energy consumption. The oven room and oil spraying room are equipped with independent strong exhaust systems due to high temperature and high humidity characteristics.

Workshop Temperature, Humidity & Air Changes per Hour

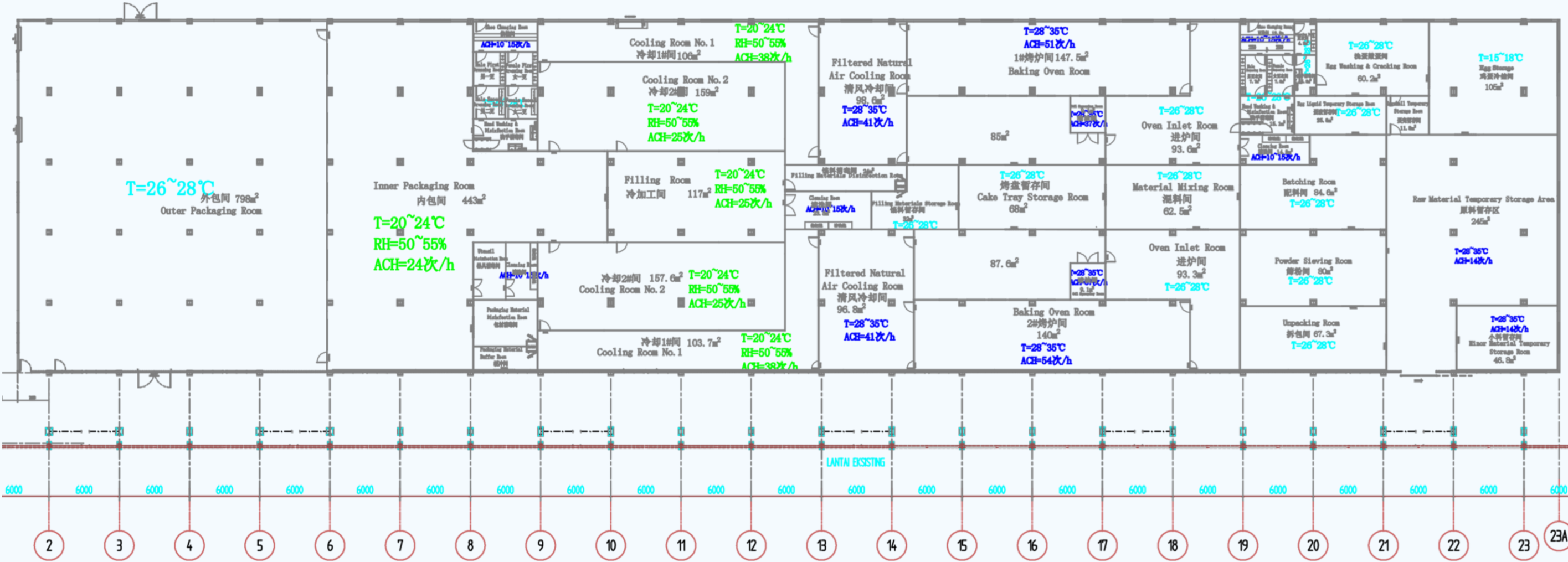
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Notes:

Core Clean Area (Inner Packaging/Filling/Cooling Room): Temperature: 20~24°C; Relative Humidity: 50%~55%; Air Changes per Hour (ACH): ≥ 24 times/h.

General Production Area (Outer Packaging and other auxiliary workshops): Temperature: 26~28°C; Air Changes per Hour (ACH): Configured according to standard process or exhaust requirements.

Control Requirements: All areas of the workshop must strictly adhere to the temperature, humidity, and air change indicators shown in the diagram to ensure an optimal environment for automated production.

Five-Layer Protection System · Shelf Life Guarantee

Project Overview

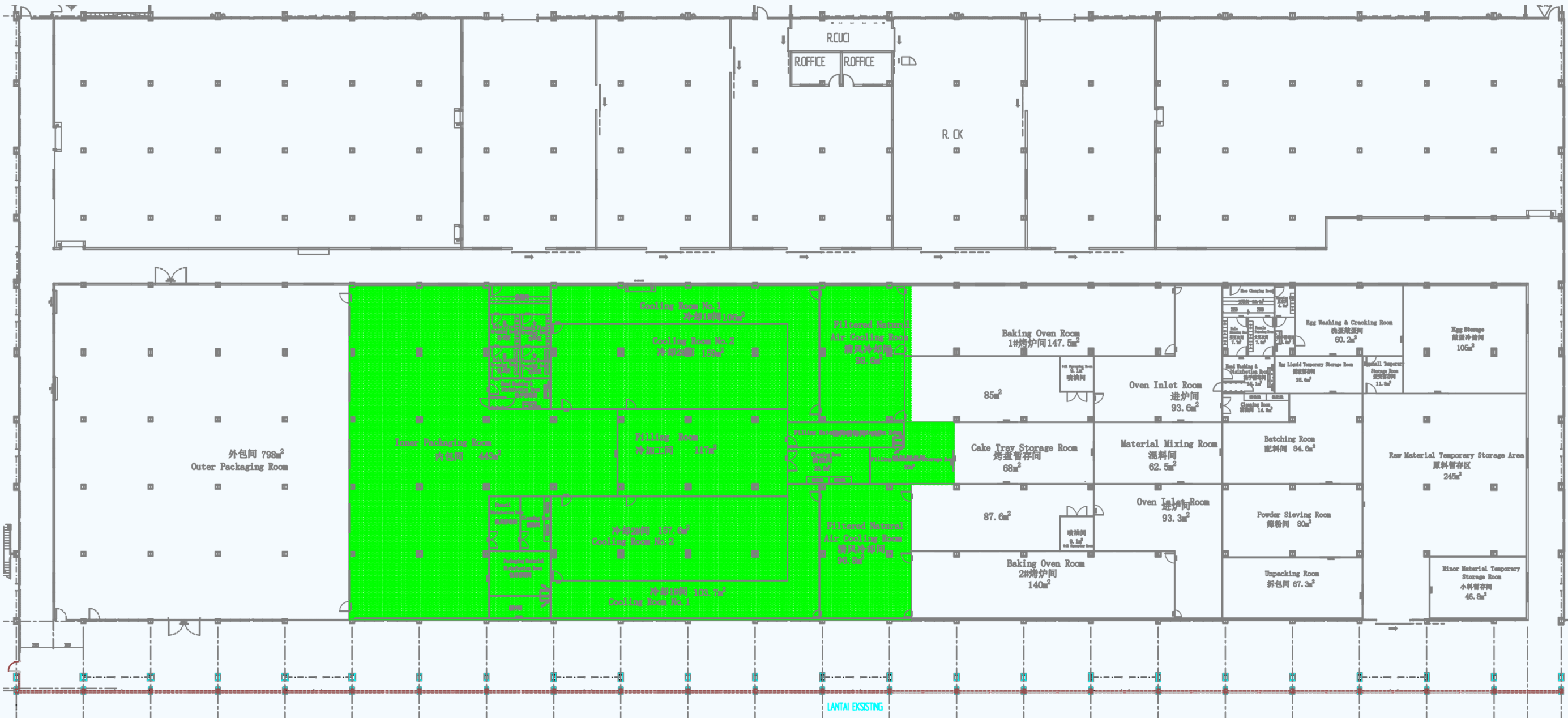
The five-layer protection, from environmental control (A) to packaging isolation (E), forms a complete food safety guarantee chain. Each layer is an independent and effective protective barrier. The multi-layer superposition ensures that products remain fresh and of high quality even under the most stringent storage conditions.

Raw Material Storage Area & Production Preparation Area

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Full-Process
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Five-Layer Protection System · Shelf Life Guarantee

Core Challenge: Although the oven is sterile at 180~200°C, the cooling process after depanning will expose it to bacteria again; cakes are high in water, sugar, and oil, with a high moisture content, making them highly susceptible to mold.

A
Environmental Control

100,000-level clean workshop
Reduce bacterial colonies in the air
Control contamination at the source

B
Air Disinfection

UV ultraviolet light
Continuous irradiation to inhibit bacteria
Uninterrupted environmental purification

C
Environmental Disinfection

Ozone coverage
Regularly kill environmental bacteria
In-depth disinfection assurance

D
Product Sterilization

Tunnel-style instantaneous sterilization
Kill surface microorganisms
99.9% sterilization rate

E
Packaging Isolation

Nitrogen-filled packaging
Isolate oxygen
Inhibit bacterial reproduction



Through the ABCDE five-layer protection system, it ensures products do not mold or deteriorate, achieving a long shelf life.

Project Overview

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Full-Process Delivery Solution



Thank you for listening.

THANK YOU FOR YOUR ATTENTION

- ◆ YUFENG

- ◆ Not just equipment, but a complete implementation solution of process + space + workflow

YUFENG
COMPLETE BAKERY AUTOMATION SOLUTION