



冰轮环境  
MOON-TECH

## VACUUM FREEZE-DRYING EQUIPMENT



冰轮环境技术股份有限公司  
MOON ENVIRONMENT TECHNOLOGY CO.,LTD.

With continuous technology and management innovation, MOON-TECH promotes the continuous optimization of resources and the reconstruction of core capabilities, accelerates the pace of international expansion, and further advances strategic transformation. It has been transformed from a traditional manufacturing enterprise to a modern and comprehensive service enterprise with strong competitiveness, large scale, wide coverage, complete business chain and strong comprehensive research and development capacity.



American Industrial Park



Malaysian Industrial Park



British Industrial Park



Vietnam Industrial Park



Baoding Industrial Park



Guxian Industrial Park



Laishan Industrial Park



Jinan Center



Refrigeration Solution



Central Air Conditioning



Eco-Friendly Heating Solutions



Energy and Chemical



Precision Casting



Hydrogen Energy Development



Intelligent Services

With the duty of revitalizing the national industry and achieving customer value, and taking the mission of “devote to improving the quality of human life” as its own mission, MOON-TECH continues to build and enhance its competitive advantage in the field of comprehensive energy utilization, accelerate the process of globalization, and strive to become an evergreen enterprise with core competitiveness, loved by employees and worthy of respect from industry partners.

# MOON-TECH

(Stock Code of 000811)

Founded in 1956, MOON Environment Technology Co., Ltd. (formerly known as Yantai MOON Co., Ltd.) takes the synchronous development of refrigeration and heating technology and active expansion of the energy-saving and environmental protection industry as development strategy. It is engaged in the technology research and development, production and sales in the fields of Refrigeration Air Conditioning, Waste Heat Recovery, Gas Compression, Industrial Heat Exchange, and Urban Energy-Saving Heat Supply, Intelligent Casting, Ultra-Clean Emissions and their related complete equipment, specializing in Food Refrigeration and Deep Processing, Ice and Snow Stadium Construction, Chemical Process Cooling, Comfortable Environment Air Conditioning, Scientific Research of Temperature Control, Environment Simulation of Wind Tunnel, Process Gas Pressurization, Building Aggregate Cooling, Comprehensive Application of Thermal Energy, Exploration and Drilling of Frozen Soil, Sewage Treatment and other industries.

MOON-TECH has production bases, scientific research centers and marketing service organizations in more than 40 countries around the world. With safe, environmentally friendly and energy-saving housekeeping solutions and intelligent system integration capabilities, it quickly responds to customers for the technology consulting, project planning and system design, equipment manufacturing, engineering construction, maintenance and repair, technical training, system upgrade and transformation and other services. The company is committed to provide customers in more than 120 countries and regions around the world with support within the whole product life cycle.

MOON-TECH has 5 national-level scientific and technological innovation platforms including the National Enterprise Technology Center and 14 provincial-level scientific and technological innovation platforms such as the Shandong Provincial Key Laboratory of Energy Saving and Environmental Protection Refrigeration Equipment. The company is identified as a key high-tech enterprise of the National Torch Plan. With 143 national patented technologies, it has taken charge of and participated in the formulation of 15 national standards and 25 industry standards. MOON-TECH won two national awards, including the National Prize for Progress in Science and Technology and the National Award for Technological Invention. It has won 102 provincial and ministerial level scientific and technological achievement awards successively, including the Special Award for Science and Technology Progress given by Chinese Association of Refrigeration and the First Prize for Science and Technology Progress in Shandong Province. The “MOON” trademark was recognized as a well-known trademark in China, and the “MOON” brand was rated as the most competitive brand in China.

In the future, MOON will be devoted to the innovation of artificial environment control technology and energy comprehensive utilization technology, actively promote the comprehensive conservation and recycling of resources, advocate a simple and moderate, green and low-carbon social production operation mode, and build “Refrigeration, Heating, Water, Gas, Electricity, Sewage, Waste” and other interconnected and complementary systems of various energy sources, to become an intelligent, green energy system solution service providers.



## Application Area

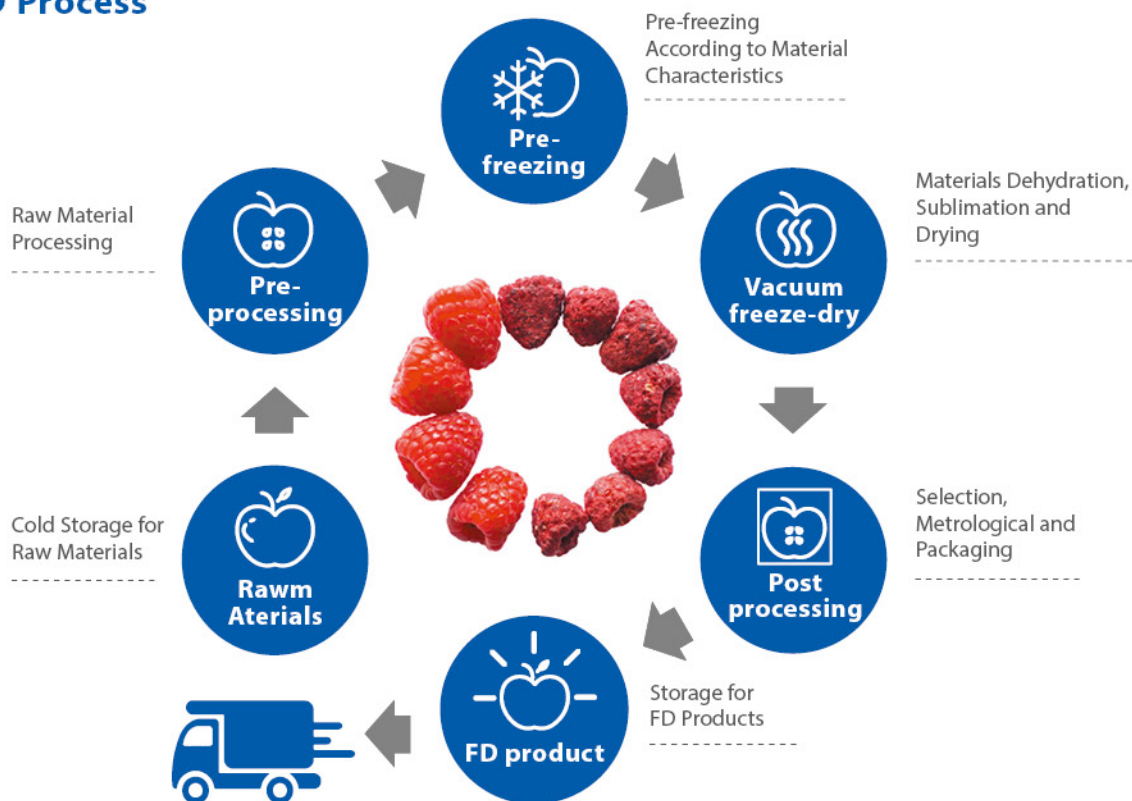


## Characteristics

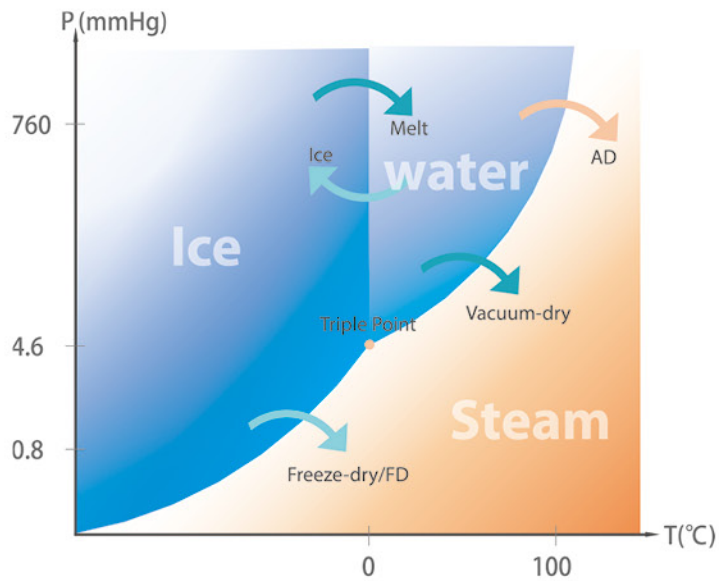
- ✓ Keep the nutrition of the food and keep the shape, color and flavor of the food.
- ✓ Light Weight, small size, long shelf life, easy to carry, storage and transportation.
- ✓ Quick Rehydration and easy to eat.
- ✓ Product diversification.



## FD Process



## Principle of Vacuum Freeze-dry Technology



After processing all kinds of food containing water according to their characteristics, under low temperature and high vacuum, the water in the pre-frozen food is directly removed as water vapor by solid sublimation without the melting of ice, thus achieving dehydration and drying of the food.

## Complete System of Vacuum Freeze-dry Equipment



## Advantage

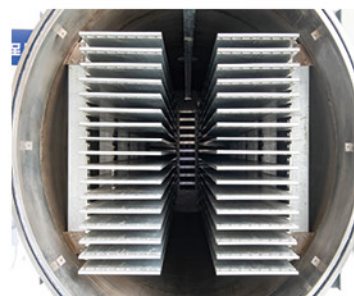
### 1 Full Control, Quality Assurance

MOON has perfect quality environmental management system, measurement and testing system and measurement guarantee ability. It has passed Det Norske Veritas ISO9001 quality system and ISO14001 Environment System Certification, national standard GB/T190022(IDT 10012) measurement system certification, american Society of Mechanical Engineering (ASME) pressure vessel product U certification, and earlier in the same industry obtained refrigeration products 5 units of the national production license.



### 2 Long History, Sophisticated Technology

Based on the freeze-drying technology of MOON and the advanced technology of Japan and Germany, and relying on the powerful machining platform of MOON, the perfect combination of advanced technology and production is realized.



### 3 Advanced Equipment, Unique Manufacture

We have many precision machining equipment from the United States, Germany, Britain and Japan, all of which implement lean management, from new products, new technology research and innovation to the process, production, quality control, after-sales every link are excellence, the interpretation of the innovation era of "manufacturing ingenuity".



### 4 Brand Manufacturers, Strategic Cooperation

With domestic and foreign first-class brand business cooperation, improve the quality of the freeze-drying equipment, but also to provide customers with high standards of service enjoy.



## FD Integration Advantage

MOON can provide project planning, engineering design, complete sets of equipment, installation and commissioning, system maintenance, technical training, system upgrade, and contract energy generation services.

01

MOON has a high-performance freeze-drying laboratory, can simulate various types of materials freeze-drying process, and can provide scientific and professional FD system solution according to the freeze-drying curve.

02

A wide range of refrigerants including ammonia (R717), carbon dioxide (R744), freon (R507a) and cryogenic alcohols.

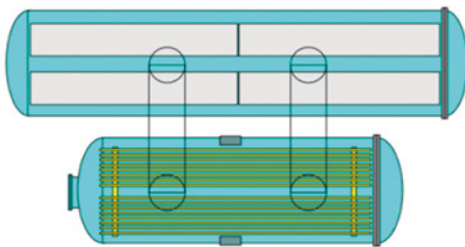
03

The FD bin has various forms, such as side-mounted type, rear-mounted type and up-and-down type. It is suitable for different kinds of materials to meet different needs of users.

04

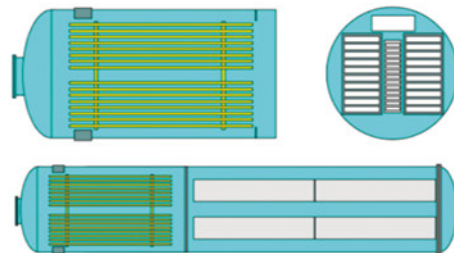
### Side-mounted Type

It is suitable for materials with high moisture content or high incoming volume in single FD bin, such as fruits and vegetables, soup pieces, tremella soup, porridge pieces, COD, sliced meat, diced meat, etc



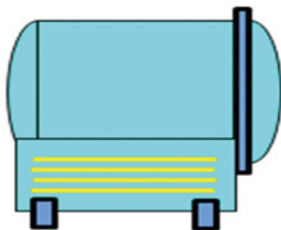
### Rear-mounted Type

It is suitable for materials with low moisture content or low incoming volume in single FD bin, such as pet food, vegetables and so on.



### Up-and-down Type

It is suitable for experiment, research and development, simulation, etc.





## Achievement

- Laiyang Luhua nutrilitite Peanut Oil Co. , Ltd.
- Shandong Ridong Food Co. , Ltd.
- Qingdao Huashirong Food Co. , Ltd.
- Jiangsu Xingye Food Co. , Ltd.
- Shandong Jining high-tech Agricultural Development Co. , Ltd.
- Heilongjiang Harbin Dashi Food Co. , Ltd.
- Qingdao Xinmeixiang Food Co. , Ltd.
- Hubei Zhongxiang Hualian Food Co. , Ltd.
- Dalian Bangchui Island Seafood Enterprise Group
- Shandong Anqiu Luan Pharmaceutical Co. , Ltd.
- Shandong Weifang Fox Food Co. , Ltd.
- Shandong Dingli Jujube Food Group Co. , Ltd.
- Japan Fr Foods Co.
- Linyi Tai Lam Food Co. , Ltd.
- Shandong Date Biotechnology Co. , Ltd.
- Linyi Yufeng Biotechnology Co. , Ltd.
- Shandong Haizhibao Marine Technology Co. , Ltd.
- Shandong Yuanda Yongsheng Food Co. , Ltd.
- Yanbian Fuyuan seafood Co. , Ltd.
- PharmaZen Ltd, T/a Waitaki Bioscience
- Neijiang Hanxin Agricultural Development Co. , Ltd.



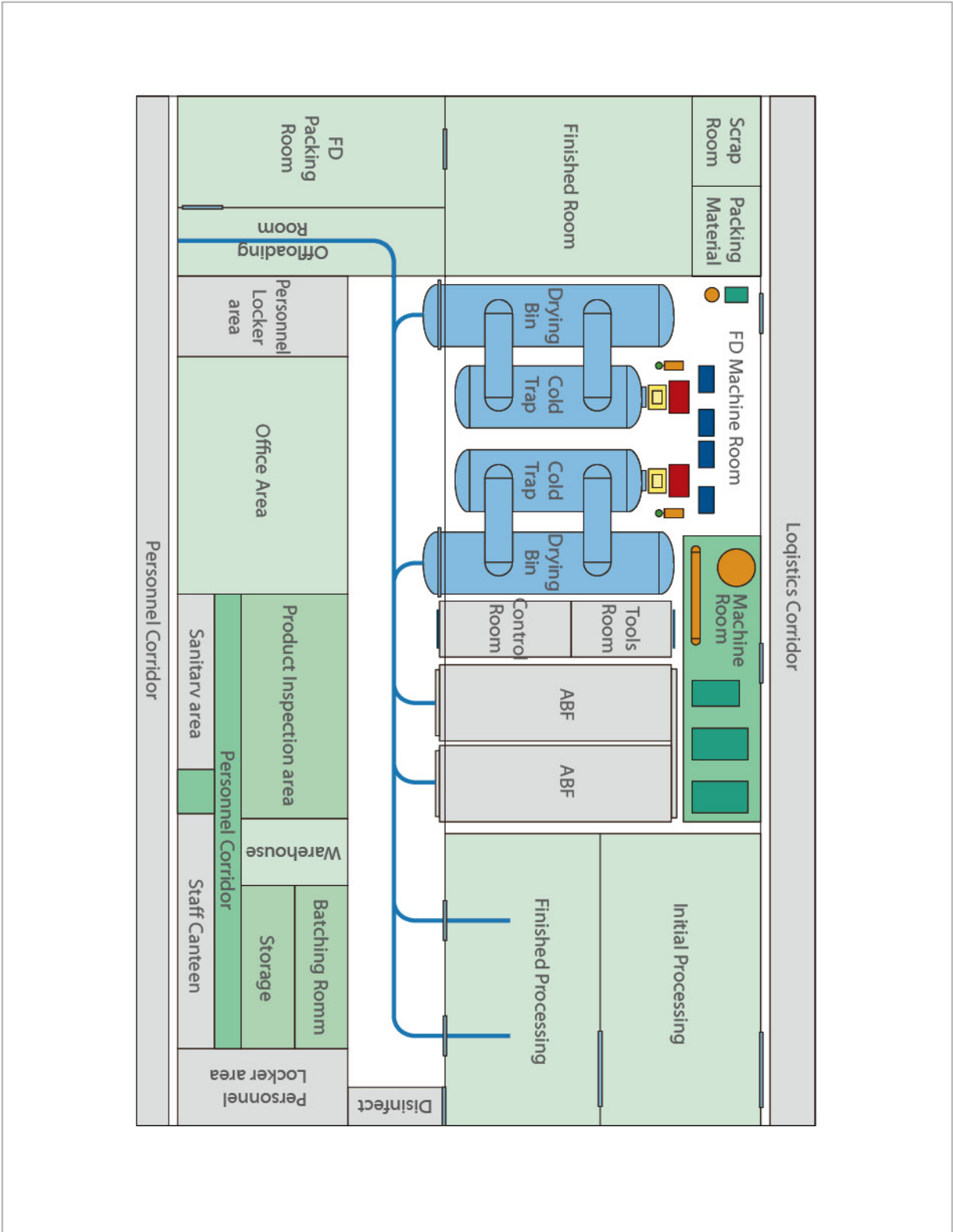
## Technical Parameter Table

| Item \ Model                      |                                             | MTFD0.2-5L                                               | MTFD2.2-50L                                                            | MTFD15-180L                                          | MTFD25-300L                 |
|-----------------------------------|---------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------|-----------------------------|
| Water Loading Capacity (L/shift)  |                                             | 5                                                        | 50                                                                     | 180                                                  | 300                         |
| Standard Feed Capacity (kg/shift) |                                             | 2.5                                                      | 30                                                                     | 200                                                  | 320                         |
| Lyophilizer Assembly              | Material                                    | SUS304, Passivation Treatment of Inner and Outer Surface |                                                                        |                                                      |                             |
|                                   | Outside Dimension (mm)                      | 1000×1000×1400                                           | 3000×2000×2100                                                         | 4000×1800×2400                                       | φ2200×7500                  |
|                                   | ChamberDoor                                 | Square, Single Open                                      | Circular Shape, Single Open                                            | Square, Single Open                                  | Circular Shape, Single Open |
|                                   | Cold trap Type                              | Underside Mounted Type                                   |                                                                        | Rear Mounted Type                                    |                             |
|                                   | Refrigeration Type                          | Direct Expansion Feed, Refrigerant: R404A/R507A          |                                                                        |                                                      |                             |
|                                   | Evaporative Temp                            | ≤-50°C                                                   |                                                                        | ≤-70°C                                               |                             |
| Shelf/ Tray                       | No. of Product Shelf                        | 3                                                        | 7                                                                      | 14                                                   | 11                          |
|                                   | Total Shelf Area                            | 0.2m <sup>2</sup>                                        | 2.2m <sup>2</sup>                                                      | 15m <sup>2</sup>                                     | 25m <sup>2</sup>            |
|                                   | Heat Transfer Mode                          | Electric Heating                                         | Circulation Radiation Heating, Heat Exchange for Electric Heating Pipe | Tray Contact Heating, Heat Exchange for Silicone Oil |                             |
|                                   | Regulating Temperature Range of The Shelves | Room Temperature ~ +100°C                                |                                                                        | -60°C~ +100°C                                        |                             |
|                                   | Tray Size(mm)                               | 360×280×32                                               | 680×550×32                                                             | 680×550×35                                           | 700×600×35                  |
|                                   | QTY of Tray                                 | 2                                                        | 6                                                                      | 40                                                   | 120                         |
|                                   | Loading Type                                | Manual Loading and Unloading                             |                                                                        |                                                      |                             |
| Vacuum System                     | Static limit Vacuum for Each One            | 13Pa                                                     |                                                                        |                                                      |                             |
|                                   | Working Pressure in Bin                     | 30~133Pa                                                 |                                                                        |                                                      |                             |
| Control                           | Control Cabinet                             | All in One , PLC Control                                 |                                                                        |                                                      |                             |
|                                   | Temperature                                 | Programming Control                                      |                                                                        |                                                      |                             |
|                                   | Vacuum                                      | Vacuum Gauge Control                                     |                                                                        |                                                      |                             |
|                                   | Voltage                                     | AC/220V/50HZ                                             |                                                                        | AC/380V/50HZ                                         |                             |

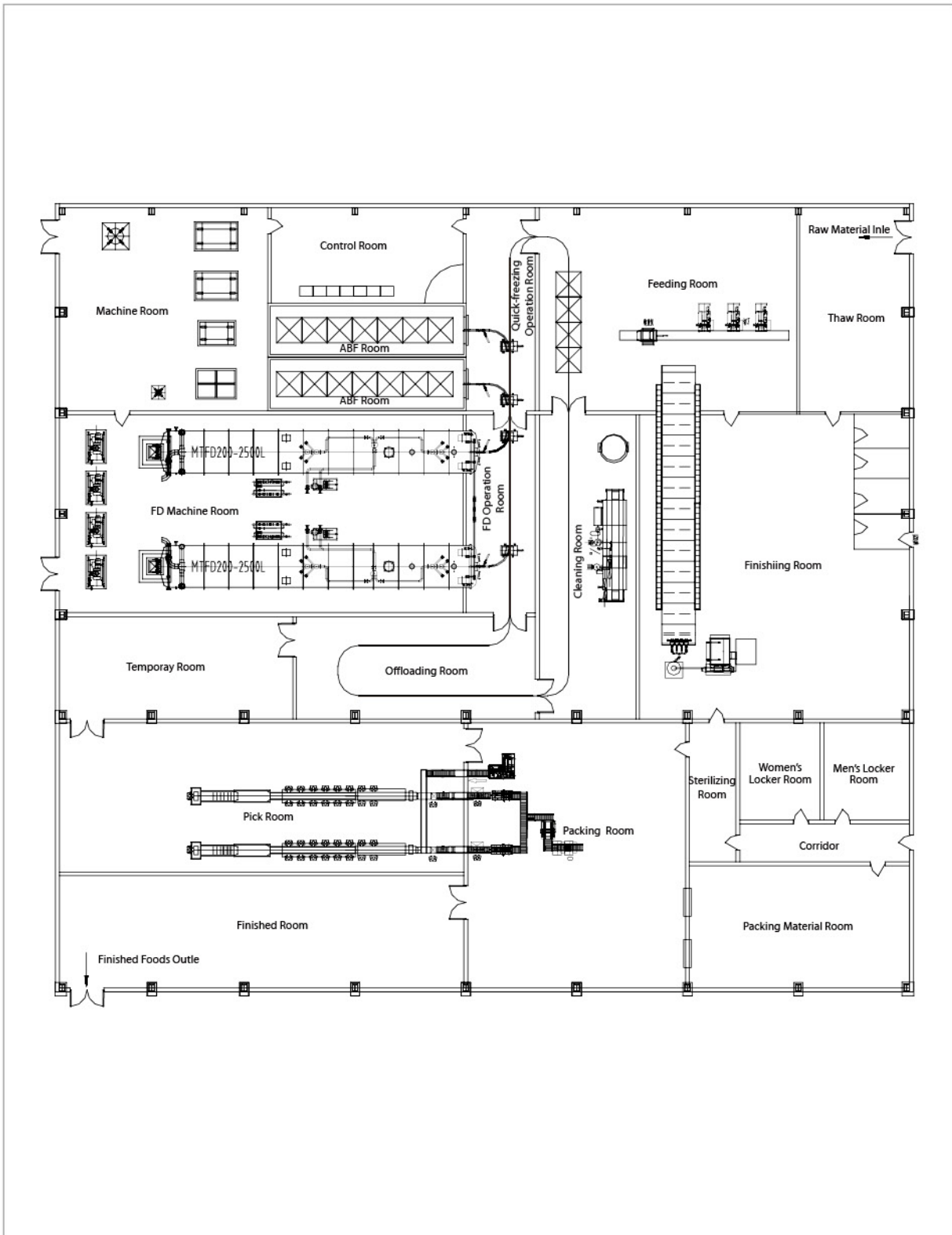
## Technical Parameter Table

| Item\ Model                       |                                             | MTFD25-300L                                                                                                              | MTFD50-600L      | MTFD100-1200L     | MTFD120-1500L                        | MTFD200-2500L             | MTFD240-3000L             |
|-----------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|--------------------------------------|---------------------------|---------------------------|
| Water Loading Capacity (L/shift)  |                                             | 300                                                                                                                      | 600              | 1200              | 1500                                 | 2500                      | 3000                      |
| Standard Feed Capacity (kg/shift) |                                             | 320                                                                                                                      | 640              | 1280              | 1520                                 | 2660                      | 3200                      |
| Lyophilizer Assembly              | Material                                    | SS400, Metal Spray on Inner Surface and Paint on Outer Surface/ SUS304, Passivation Treatment of Inner and Outer Surface |                  |                   |                                      |                           |                           |
|                                   | Outside Dimension (mm)                      | Φ1800×6800                                                                                                               | Φ2300×6900       | Φ2300×9600        | Φ2500×11000                          | Φ2500×11700<br>Φ2500×7100 | Φ2500×12850<br>Φ2500×7600 |
|                                   | ChamberDoor                                 | Circular Shape, Single Open                                                                                              |                  |                   |                                      |                           |                           |
|                                   | Cold trap Type                              | Rear Mounted Type                                                                                                        |                  |                   | Rear Mounted Type/ Side Mounted Type |                           |                           |
|                                   | Refrigeration Type                          | Direct Expansion Feed/ Ppump Feed, Refrigerant: R507A/ CO <sub>2</sub> /R717                                             |                  |                   |                                      |                           |                           |
|                                   | Evaporative Temp                            | ≤-40°C                                                                                                                   |                  |                   |                                      |                           |                           |
| Shelf/ Tray                       | No. of Product Shelf                        | 11                                                                                                                       | 17               | 17                | 20                                   | 20                        | 21                        |
|                                   | Total Shelf Area                            | 25m <sup>2</sup>                                                                                                         | 50m <sup>2</sup> | 100m <sup>2</sup> | 120m <sup>2</sup>                    | 200m <sup>2</sup>         | 240m <sup>2</sup>         |
|                                   | Heat Transfer Mode                          | Circulation Radiation Heating, Heat Exchange for 0.5MPa Saturated Steam                                                  |                  |                   |                                      |                           |                           |
|                                   | Regulating Temperature Range of The Shelves | Room Temperature ~ +120°C                                                                                                |                  |                   |                                      |                           |                           |
|                                   | Tray Size(mm)                               | 415×515×32                                                                                                               | 680×550×32       | 680×550×32        | 680×550×32                           | 680×550×32                | 680×550×32                |
|                                   | QTY of Tray                                 | 120                                                                                                                      | 128              | 256               | 304                                  | 532                       | 640                       |
|                                   | Loading Type                                | Suspension Rail Type                                                                                                     |                  |                   |                                      |                           |                           |
| Vacuum System                     | Static limit Vacuum for Each One            | 13Pa                                                                                                                     |                  |                   |                                      |                           |                           |
|                                   | Working Pressure in Bin                     | 30~133Pa                                                                                                                 |                  |                   |                                      |                           |                           |
| Control                           | Control Cabinet                             | Split Type , PLC Control                                                                                                 |                  |                   |                                      |                           |                           |
|                                   | Temperature                                 | Temperature Controller Control                                                                                           |                  |                   |                                      |                           |                           |
|                                   | Vacuum                                      | Vacuum Gauge Control                                                                                                     |                  |                   |                                      |                           |                           |
|                                   | Voltage                                     | AC/380V/50HZ                                                                                                             |                  |                   |                                      |                           |                           |

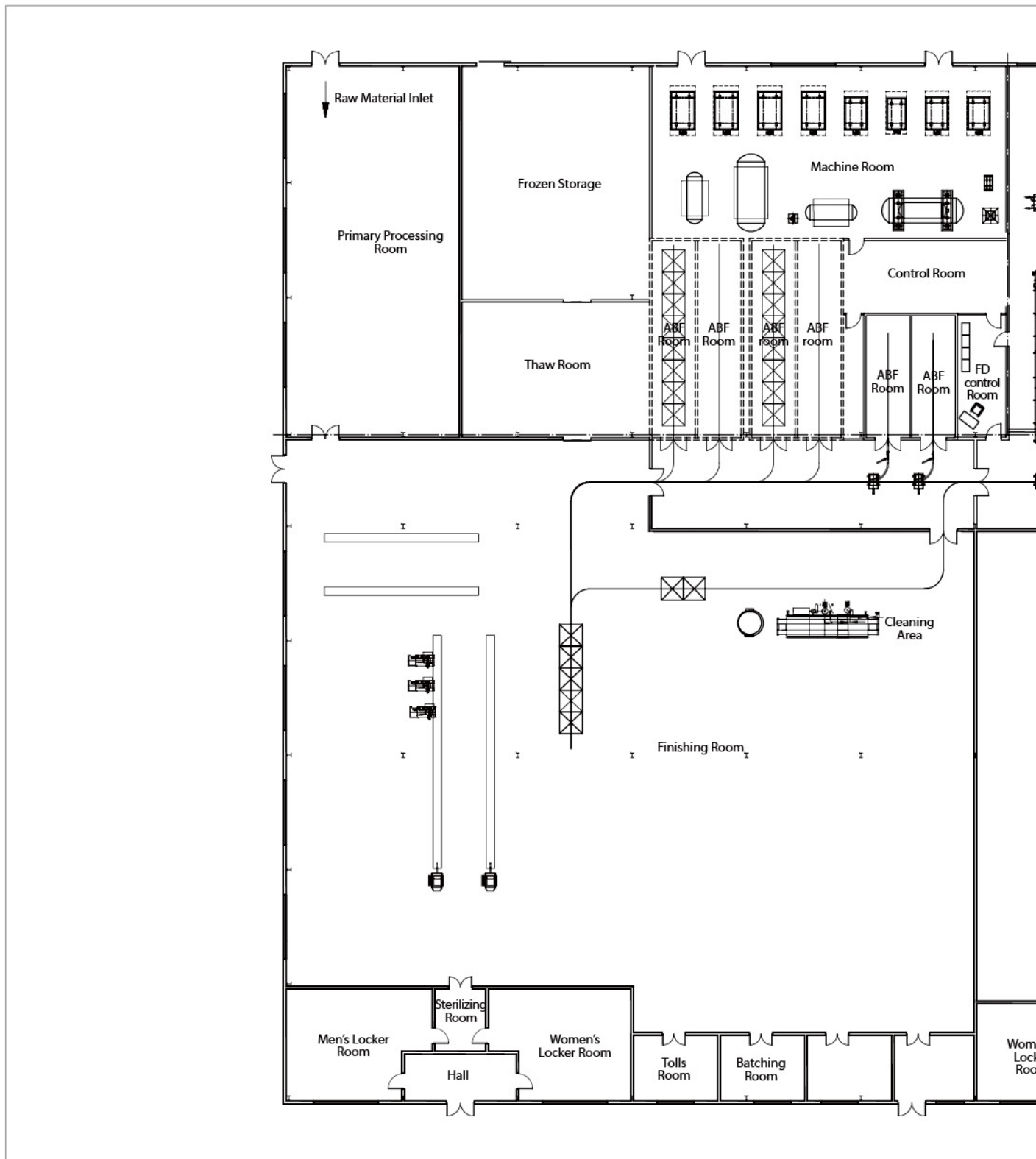
## FD layout Schematic

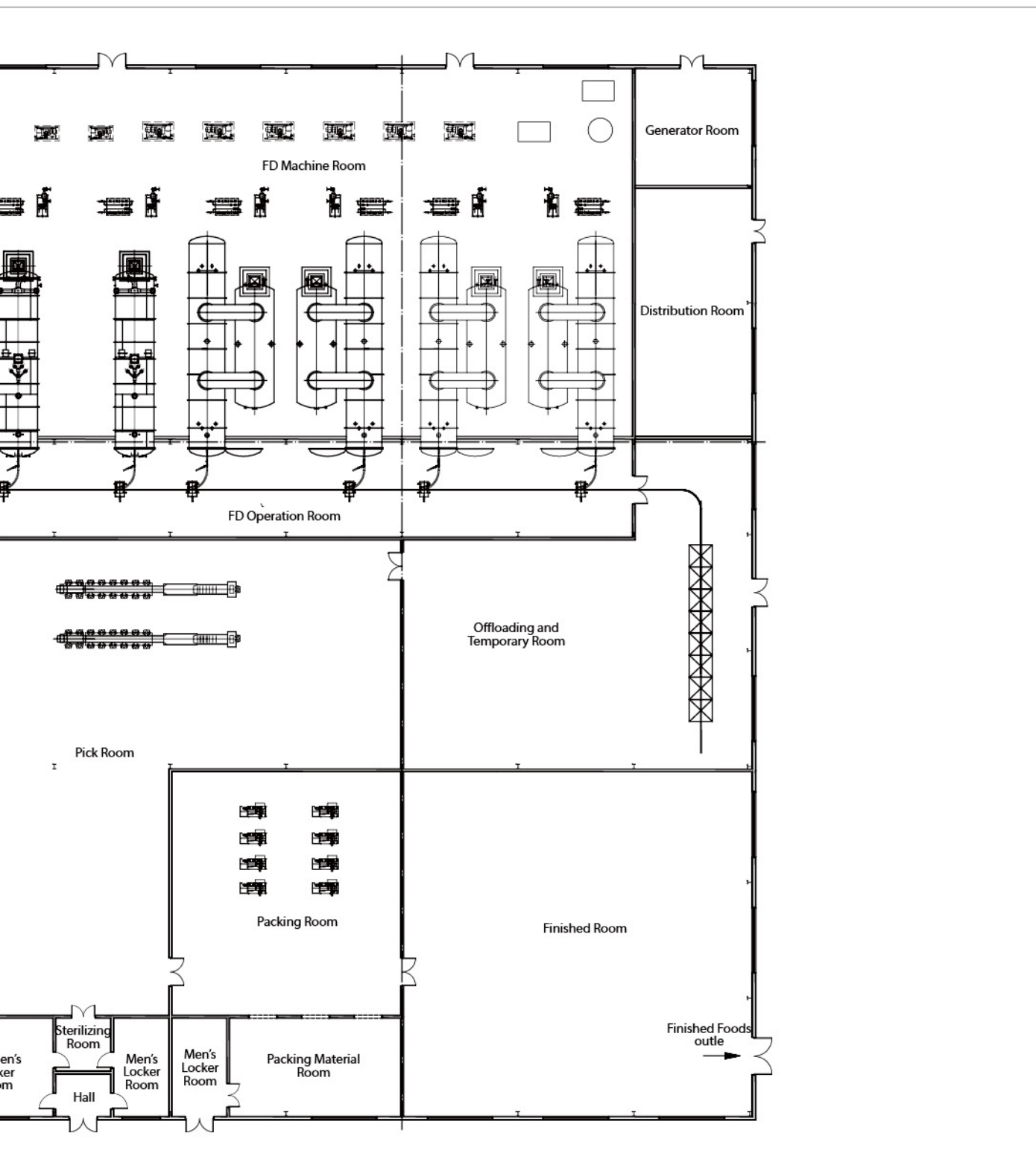


## FD Layout Plan for Pet Foods

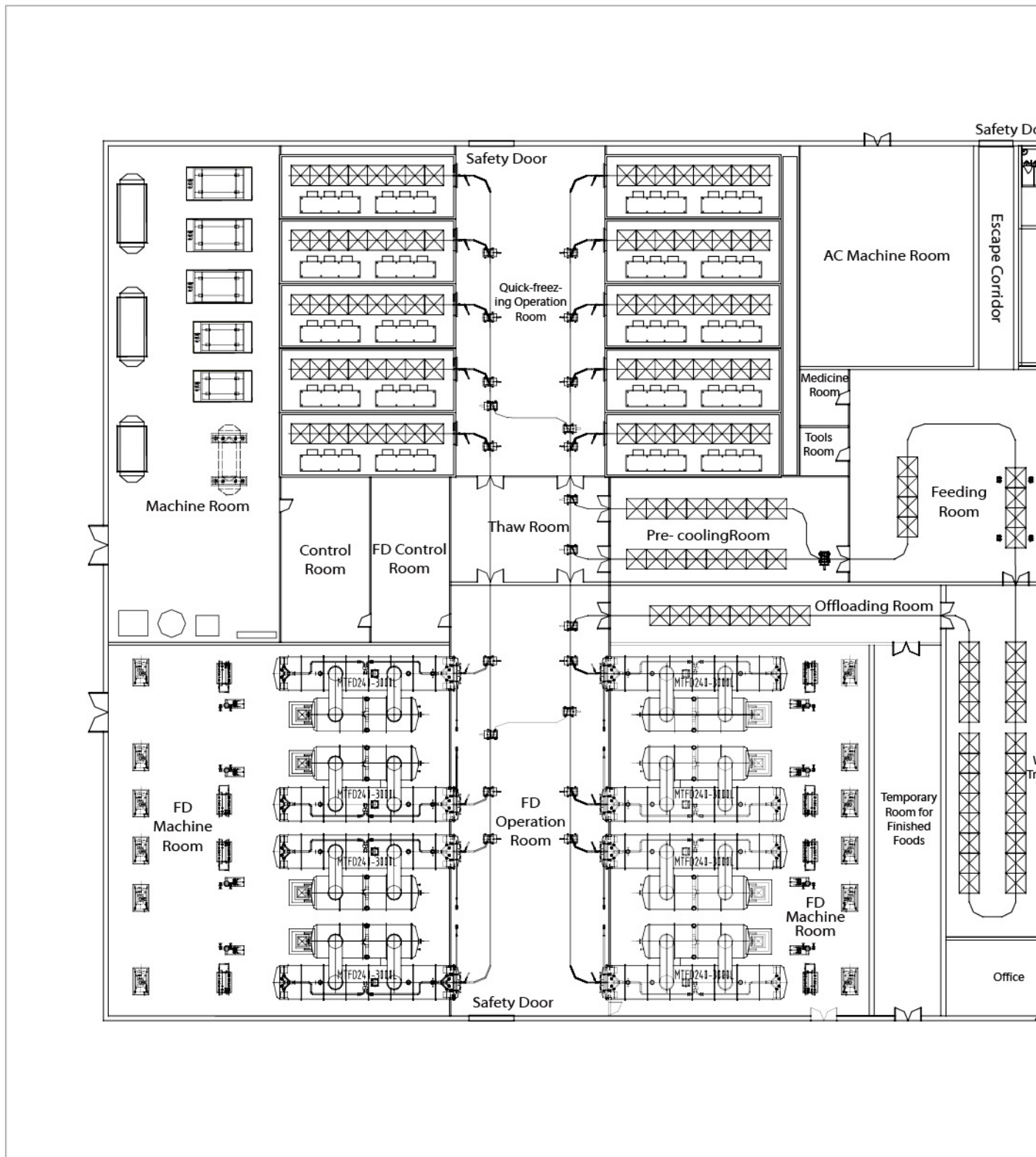


## FD Layout Plan for Fruits and Vegetables

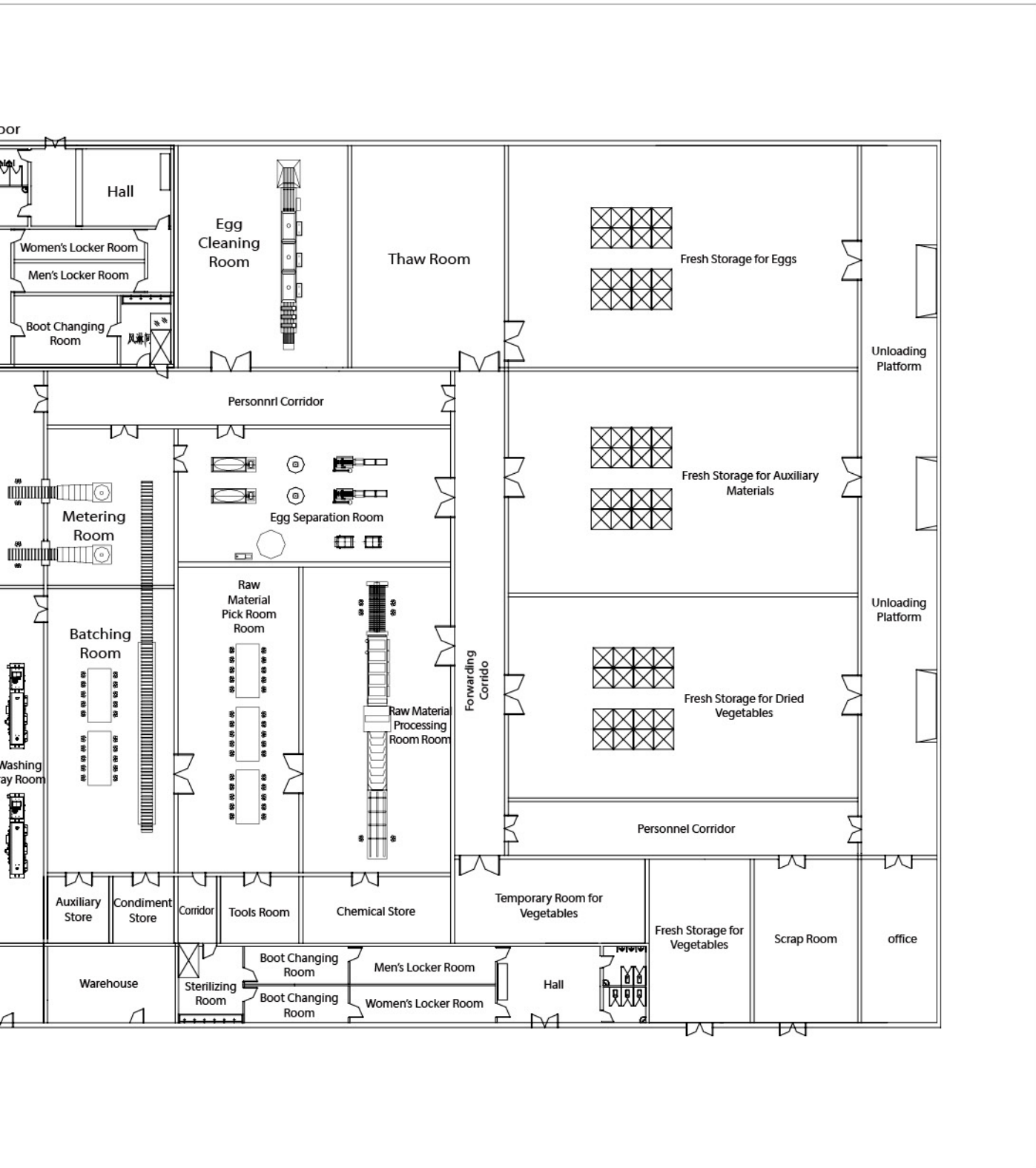




## FD Layout Plan for Soup Pieces

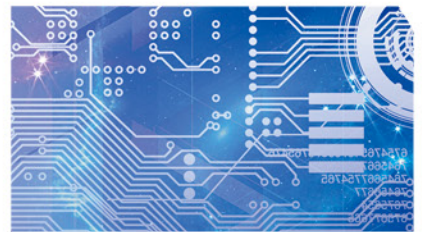


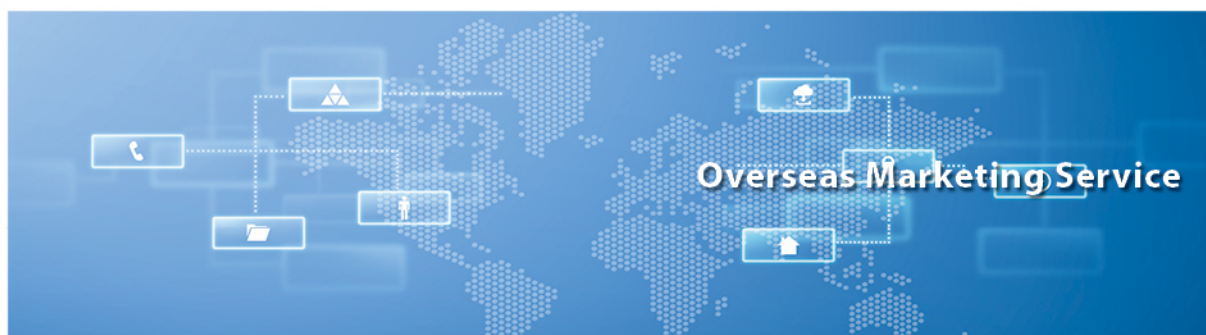






**MICG**  
冰轮智汇云





**Yantai Moon (Vietnam) Co., Ltd.**

Mobile: +84-937927588

Email: tenglin@moon-tech.com

Mobile: +84-906893588

Email: jeffchong@moon-tech.com

**Pt. Yantai Moon Indonesia (Jakarta)**

Mobile: +62-812-8570458

Email: stevenchen@moon-tech.com

**Pt. Yantai Moon Indonesia (Surabaya)**

Mobile: +62-813-15817758

Email: kevinxu@moon-tech.com

**Thailand Office**

Mobile: +66-970749735

Email: shimeihao@moon-tech.com

**Myanmar Office**

Mobile: +95-9795856929

Email: naizengliu@moon-tech.com

**Malaysia Office**

Mobile: +60-162285069

Email: qingfangma@moon-tech.com

**Taiwan Office**

Mobile: +886-975096307

Email: hetaoliu@moon-tech.com

**India Office**

Mobile: +91-9867215115

Email: allengao@moon-tech.com

**Philippines Office**

Mobile: +63-9171171410

Email: xuhangyuan@moon-tech.com

**Uzbekistan Office**

Mobile: +998-909278908

Email: zhongyao@moon-tech.com

**Saudi Arabia Office**

Mobile: +966-504362717

Email: tonydeng@moon-tech.com

**Oman/Iran Office**

Mobile: +96877201348(Oman)

+989309941901 (Iran)

Email: perryxue@moon-tech.com

**Moscow Russia Office**

Mobile: +7-9250566475

Email: yanli@moon-tech.com

Email: pengyuanche@moon-tech.com

**Vladivostok Russia Office**

Mobile: +7-9143430880

Email: hongweiwu@moon-tech.com

**Chile Office**

Mobile: +56-994888888

Email: simonliu@moon-tech.com

**Peru Office**

Mobile: +51-956255569

Email: malie@moon-tech.com

**Ecuador Office**

Mobile: +593-987877420

Email: peterzhang@moon-tech.com

**Argentina Office**

Mobile: +54-91171008380

Email: javierli@moon-tech.com

**Egypt Office**

Mobile: +966-548730449

Email: shajc@moon-tech.com

**South Africa Office**

Mobile: +27-638491822

Email: Joechen@moon-tech.com

**Mauritania Office**

Mobile: +222-41834569

Email: perryxin@moon-tech.com

# 致力于人类生活质量的提高

MAKING A BETTER LIFE



Project  
Planning



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Engineering  
Design



Complete  
Equipment



Installation and  
Commissioning



Employee  
Training



System Mainte-  
nance



System Diagnostic  
Upgrade



Contract Energy  
Management


**MOON ENVIRONMENT TECHNOLOGY CO.,LTD.**

No.1 Binglun Road, Yantai, China

P.C: 264002

Tel: +86-535-6245052



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