



冰轮环境  
MOON-TECH

智慧 / 绿能 / 生态  
INTELLIGENT GREEN ENERGY ECOLOGY

## VACUUM FREEZE-DRYING EQUIPMENT



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

With continuous technological and manage has promoted the continuous optimization of resource allocation and reconstruction of core competencies, Moon-TECH accelerated international expansion transformation. We have transformed from a traditional manufacturing enterprise to a modern service-oriented enterprise with strong competitiveness, large scale, wide coverage, complete business chain, and strong comprehensive research and development capabilities



Industrial Park in the US



Malaysian Industrial Park



Industrial Park in the UK



Vietnam Industrial Park



Baoding Industrial Park



Guxian Industrial Park



Laishan Industrial Park



Jinan Center

# MOON-TECH

(Stock Code of 000811)



Low-temperature refrigeration



Central air-conditioning



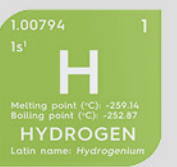
Environmentally friendly heating



Energy and chemical equipment



Precision Casting



Hydrogen Energy Development



Smart Services



Intelligent Packing Machinery and Warehouse Storage System

With devoting to improving the quality of human life as the enterprise mission, MOON-TECH continuously build and enhance competitive advantages in the field of comprehensive energy utilization and accelerate the process of globalization, taking the revitalization of national industry and achievement of customer value as its responsibility, continuously creates and improves its competitive advantage, striving to become an evergreen enterprise with core competitiveness, loved by employees and respected by industrial partners.

Founded in 1956, Moon Environment Technology Co., Ltd (Stock Code: 000811). is a diversified and international comprehensive equipment industrial enterprise. The main business covers low-temperature refrigeration, central air conditioning, environmental protection heating, energy and chemical equipment, precision castings, smart services, hydrogen energy development, etc. In recent years, MOON-TECH has successively won the titles of Top 30 Enterprises with Core Competitiveness in China's Machinery Industry, Top 100 Enterprises of National Machinery Industry, Meritorious Enterprise of Equipment in China, and Demonstration Enterprise for Ozone Layer Protection.

For a longtime, with continuous technological and manage has promoted the continuous optimization of resource allocation and reconstruction of core competencies, accelerated international expansion transformation. We have transformed from a traditional manufacturing enterprise to a modern service-oriented enterprise with strong competitiveness, large scale, wide coverage, complete business chain, and strong comprehensive research and development capabilities

With the synchronous development of refrigeration and heat treatment, and actively expanding energy-saving and environmental protection industry as developing strategy, MOON-TECH is engaged in the technical research and development of low-temperature environment, waste heat recovery, gas compression, industrial heat exchange, urban clean emission and other fields, as well as the production and sales of related complete sets of equipment, and specializes in food refrigeration, chemical process cooling, comfortable environment air conditioning, research temperature control, process gas compression, building aggregated cooling, comprehensive application of heat energy, permafrost drilling, waste treatment, tec. MOON-TECH has production bases, scientific research centers and marketing& service organizations in more than 40 countries around the world. With safe, environmentally friendly, energy-saving, intelligent and Butler-style system integration capabilities, MOON-TECH is providing products with entire product life cycle to users in more than 120 countries and regions around the world.

MOON-TECH has 6 national scientific and technological innovation platforms including the National-Recognized Enterprise Technology Center and 16 provincial scientific and technological innovation platforms including the Shandong Provincial Key Laboratory of Energy Saving and Environmental Protection of Refrigeration Equipment. MOON-TECH has been recognized as a key high-tech enterprise of the China Torch Program, with 326 national patented technologies, and has hosted and participated in the formulation of 25 national standards and 37 industry standards. MOON-TECH has won two national awards, the National Science & Technology Progress Award and the National Technology Invention Award, and has successively won 213 provincial and ministerial scientific and technological achievements awards such as the Special Prize for Scientific and Technological Progress of the Chinese Association of Refrigeration and the First Prize for Scientific and Technological Progress of Shandong Province.

Following the requirements of the environmental policy of harmonious coexistence between human and nature, MOON-TECH is committed to the innovation of artificial environment control technology and comprehensive energy utilization technology to promote a simple, moderate, green and low-carbon mode of social production and operating system, actively building an interconnected and complementary system, including refrigeration, heating, water, gas, electricity, sewage, waste within the -271°C -200°C temperature and 0-90Mpa pressure range, aiming to achieve an energy ecological link between industrial parks and living spaces, and become an intelligent green energy system solution service provider. MOON-TECH also dedicates to develop the utilizations of NH3、CO2、HC、He、H2O and other environmentally friendly substances application technologies, striving to provide professional, high value-added intelligent energy comprehensive utilization solutions.

In recent years, MOON-TECH actively actualized the green and low-carbon developing concept, accelerating the transformation of traditional industries around the dual-carbon goal and energy revolution, promoting the upgrading of the industrial structure to a low-carbon and high-quality level, and set six goals of "low-carbon industry, low-carbon technology, low-carbon manufacturing, low-carbon chain, low-carbon services, low-carbon culture", so as to ultimately realize the industrial structure of high-end, low-carbon consumption of energy, utilization of resources recycling, cleanliness of the production process, and to contribute to the realization of dual-carbon target.



## Application Area

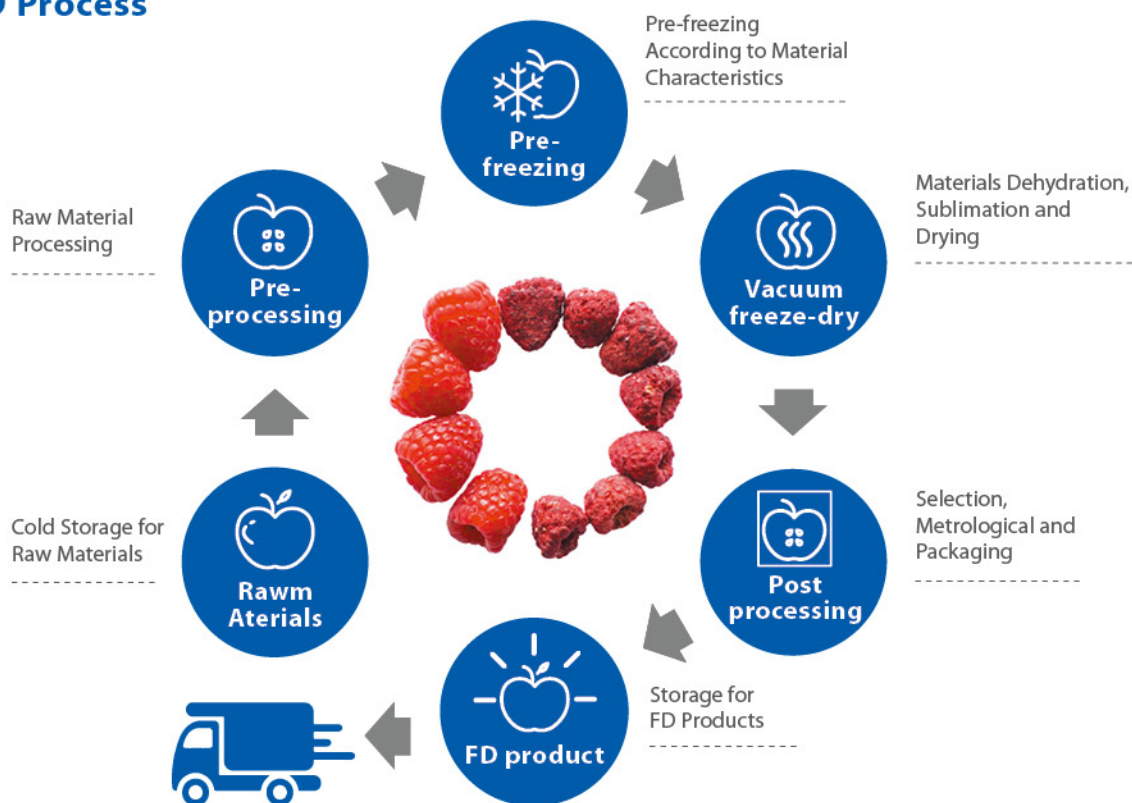


## Characteristics

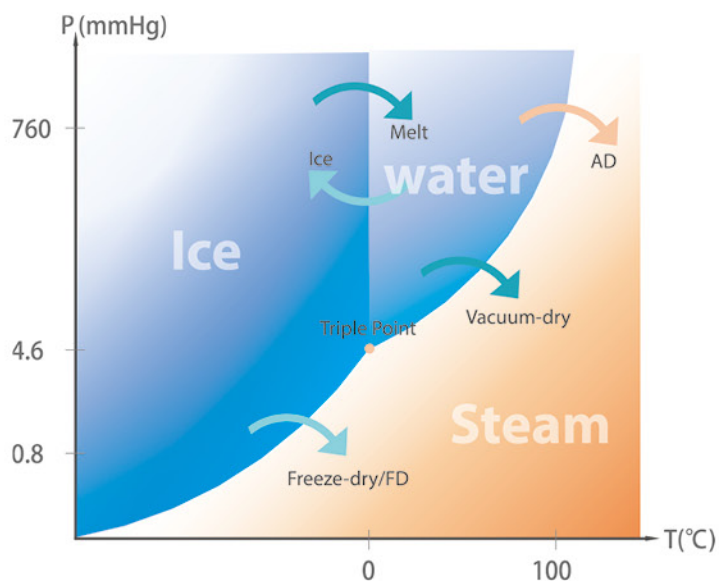
- ✓ Keep the nutrition of the food and keep the shape, color and flavor of the food.
- ✓ Light Weight, small size, long shelf life, easy to carry, storage and transportation.
- ✓ Quick Rehydration and easy to eat.
- ✓ Product diversification.



## 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.

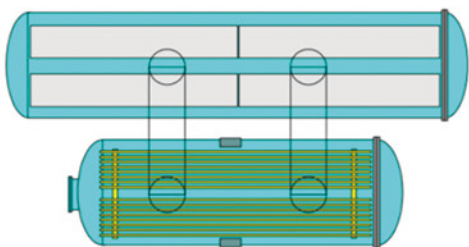
03

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

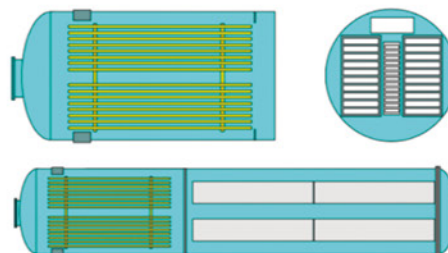
### Side-mounted Type

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



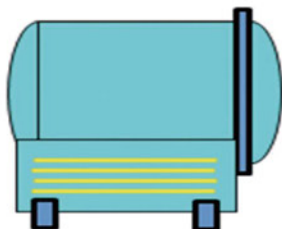
### Rear-mounted Type

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 nutrilit Peanur 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

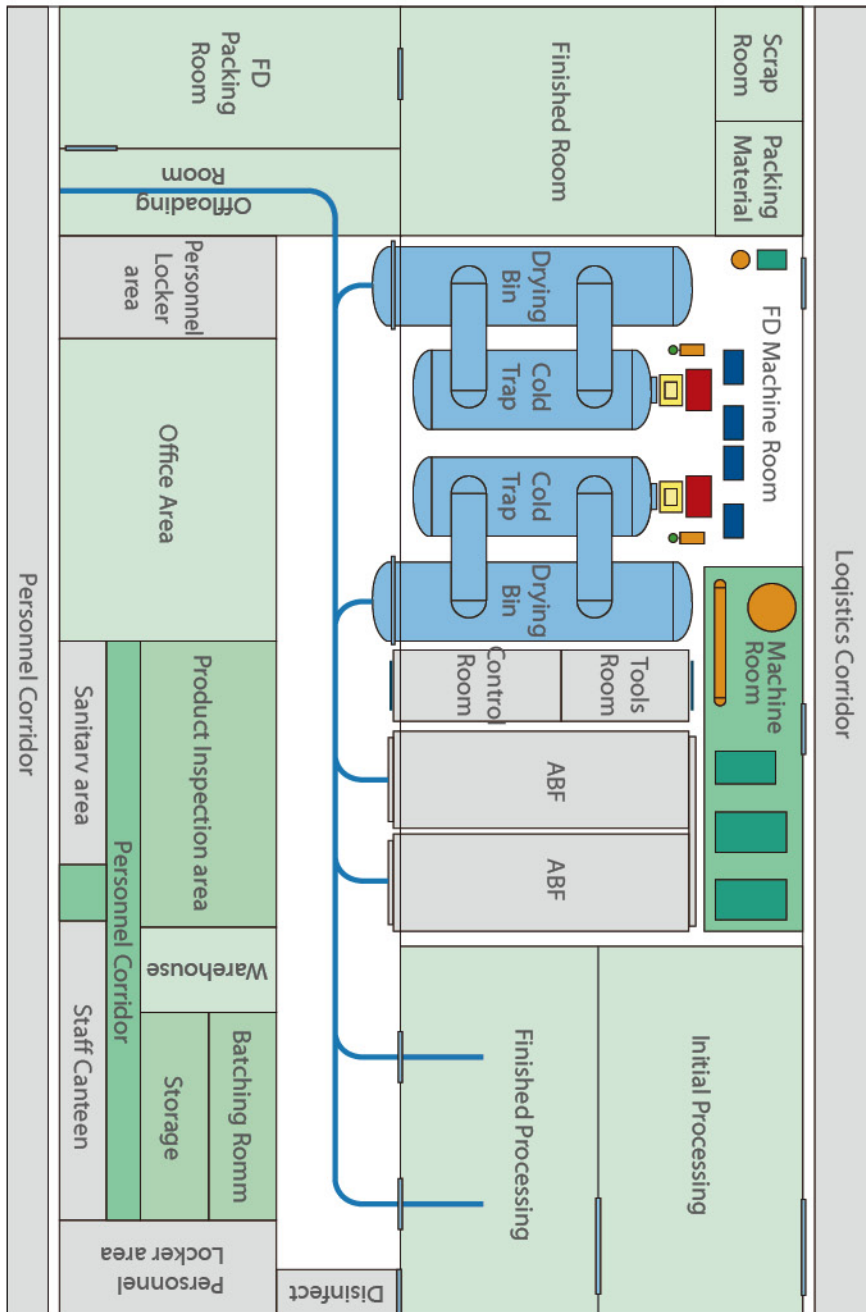
| Item\ Model                       |                                             | MTFD0.2-5L                                               | MTFD2.2-50L                                                            | MTFD15-180L                                          | MTFD25-300L                 |
|-----------------------------------|---------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------|-----------------------------|
| 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℃                                                    |                                                                        | ≤-70℃                                                |                             |
| Shelf/ Tray                       | No. of Product Shelf                        | 3                                                        | 7                                                                      | 14                                                   | 11                          |
|                                   | Total Shelf Area                            | 0.2m²                                                    | 2.2m²                                                                  | 15m²                                                 | 25m²                        |
|                                   | 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℃                                 |                                                                        | -60℃~ +100℃                                          |                             |
|                                   | 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

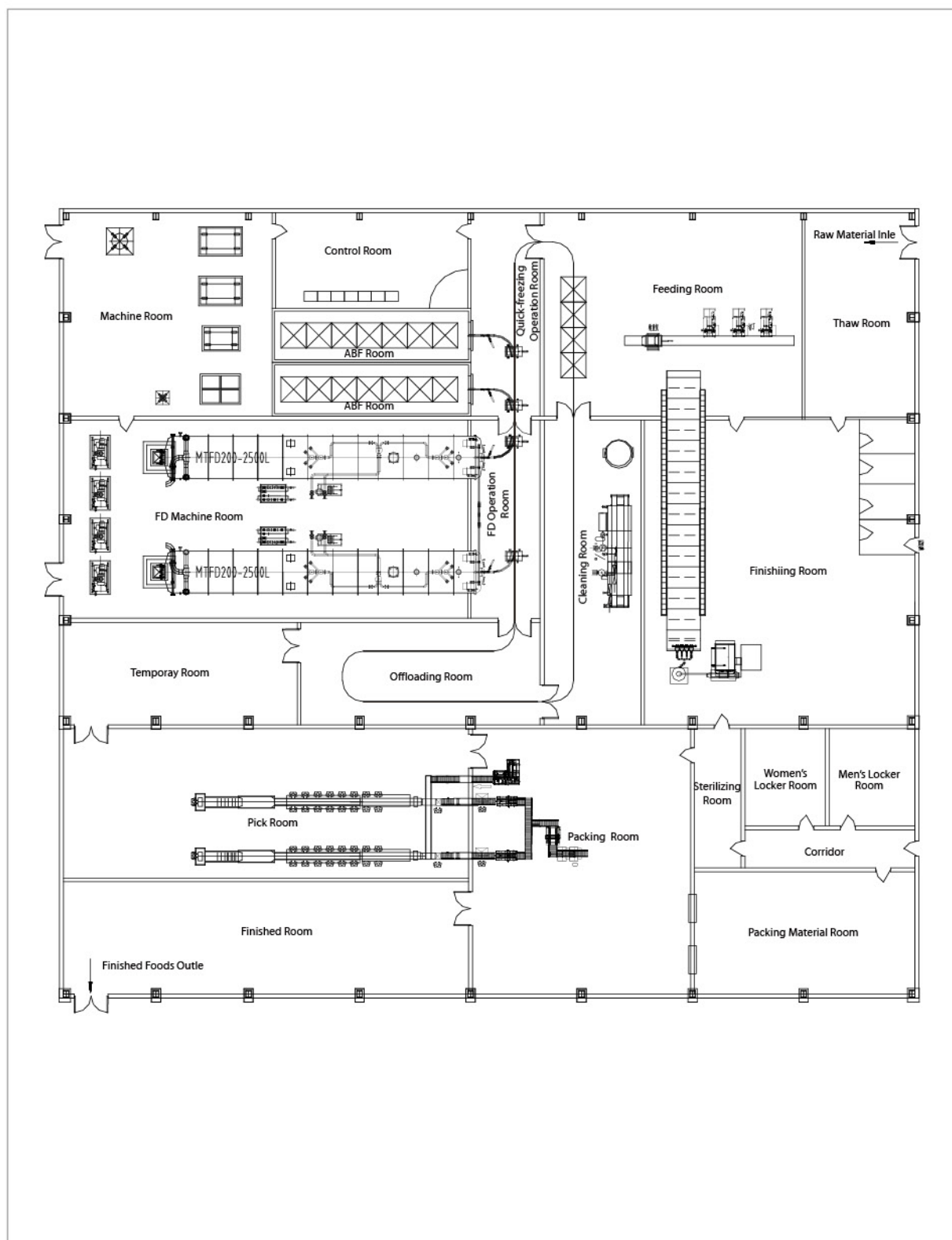
| Item\ Model                       |                                             | MTFD25-300L                                                                                                              | MTFD50-600L      | MTFD100-1200L                        | MTFD120-1500L     | MTFD200-2500L             | 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℃                                                                                                                    |                  |                                      |                   |                           |                           |
| 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℃                                                                                                 |                  |                                      |                   |                           |                           |
|                                   | 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                                                                                                             |                  |                                      |                   |                           |                           |



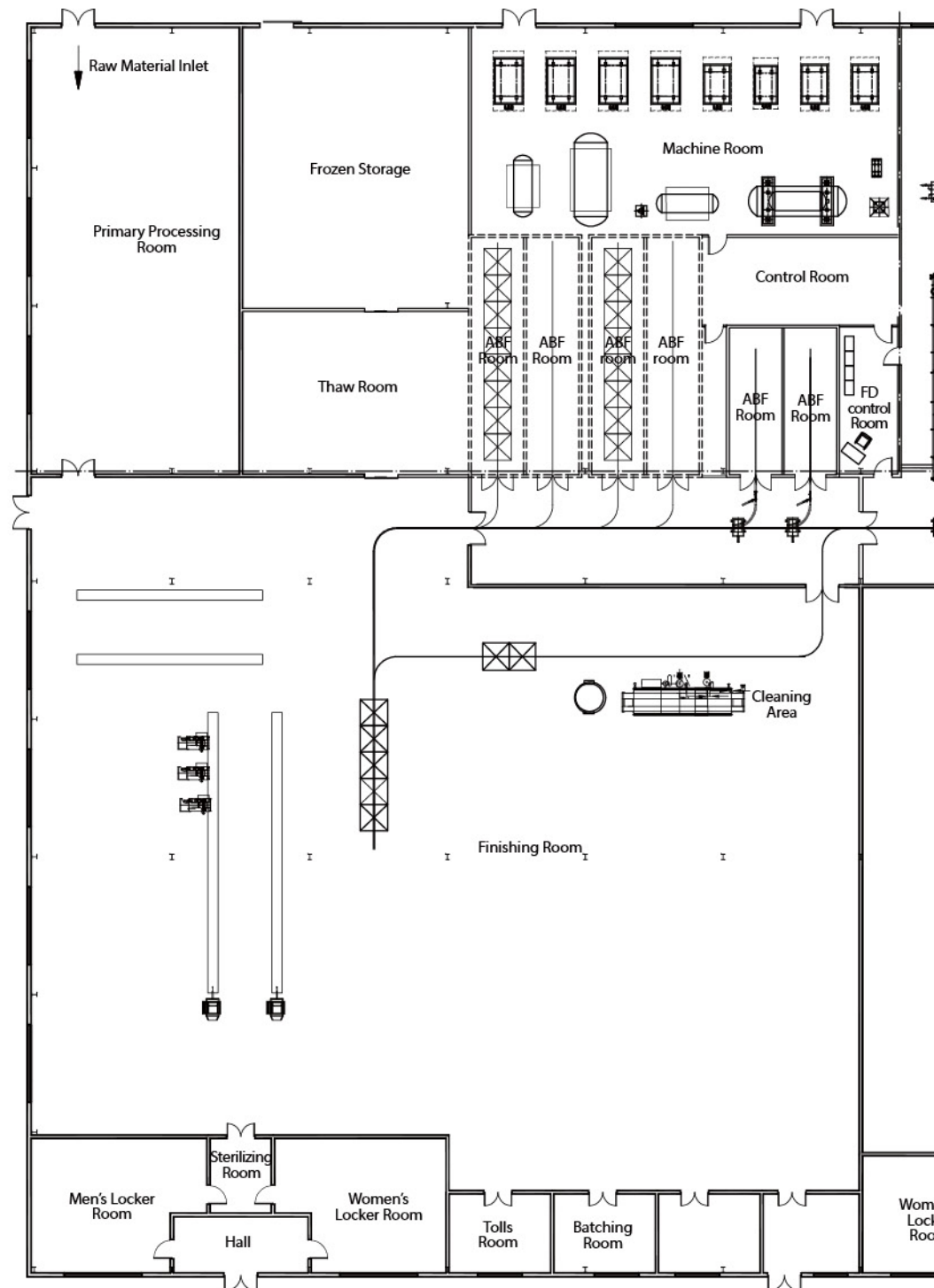
## FD layout Schematic

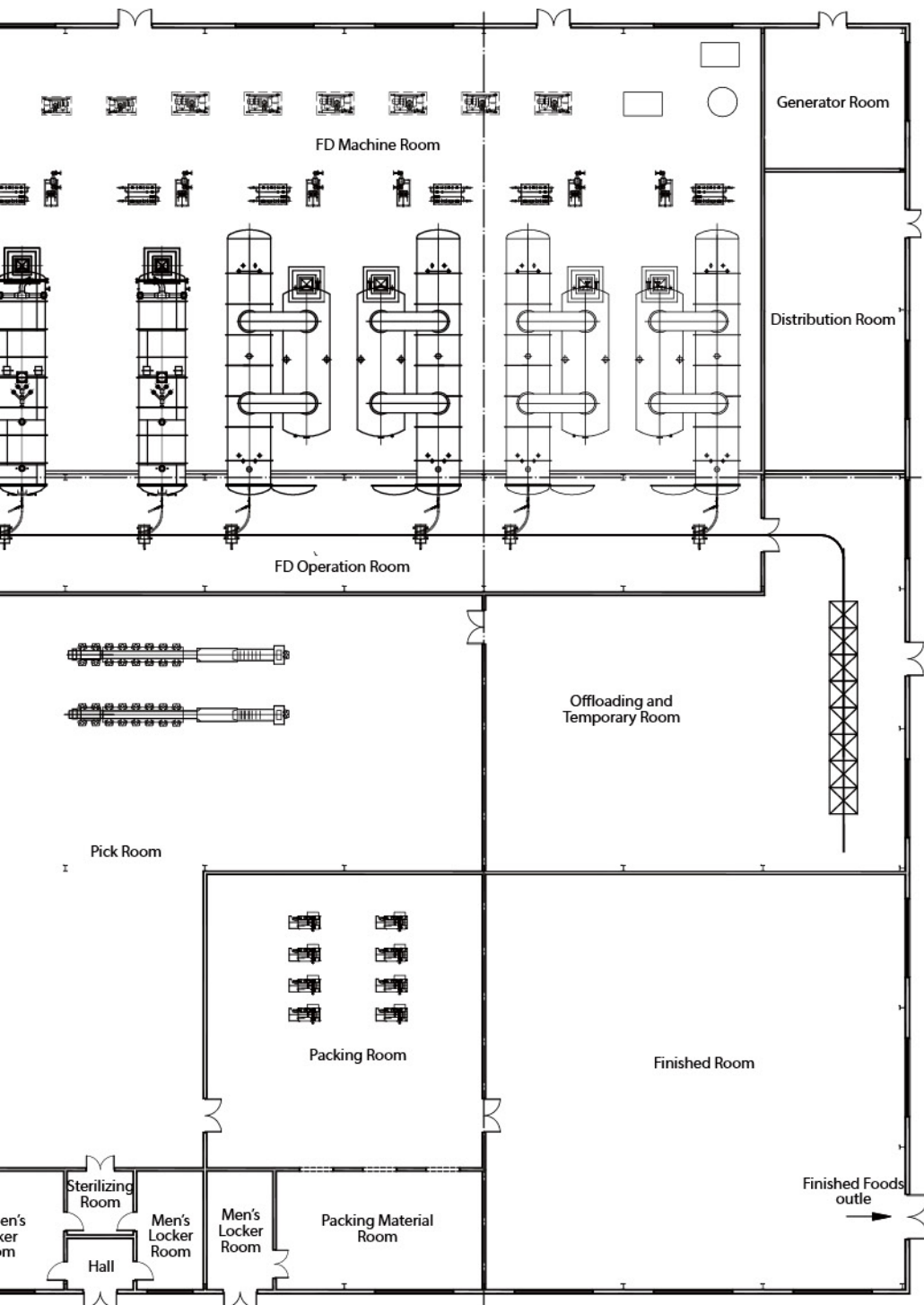


## FD Layout Plan for Pet Foods

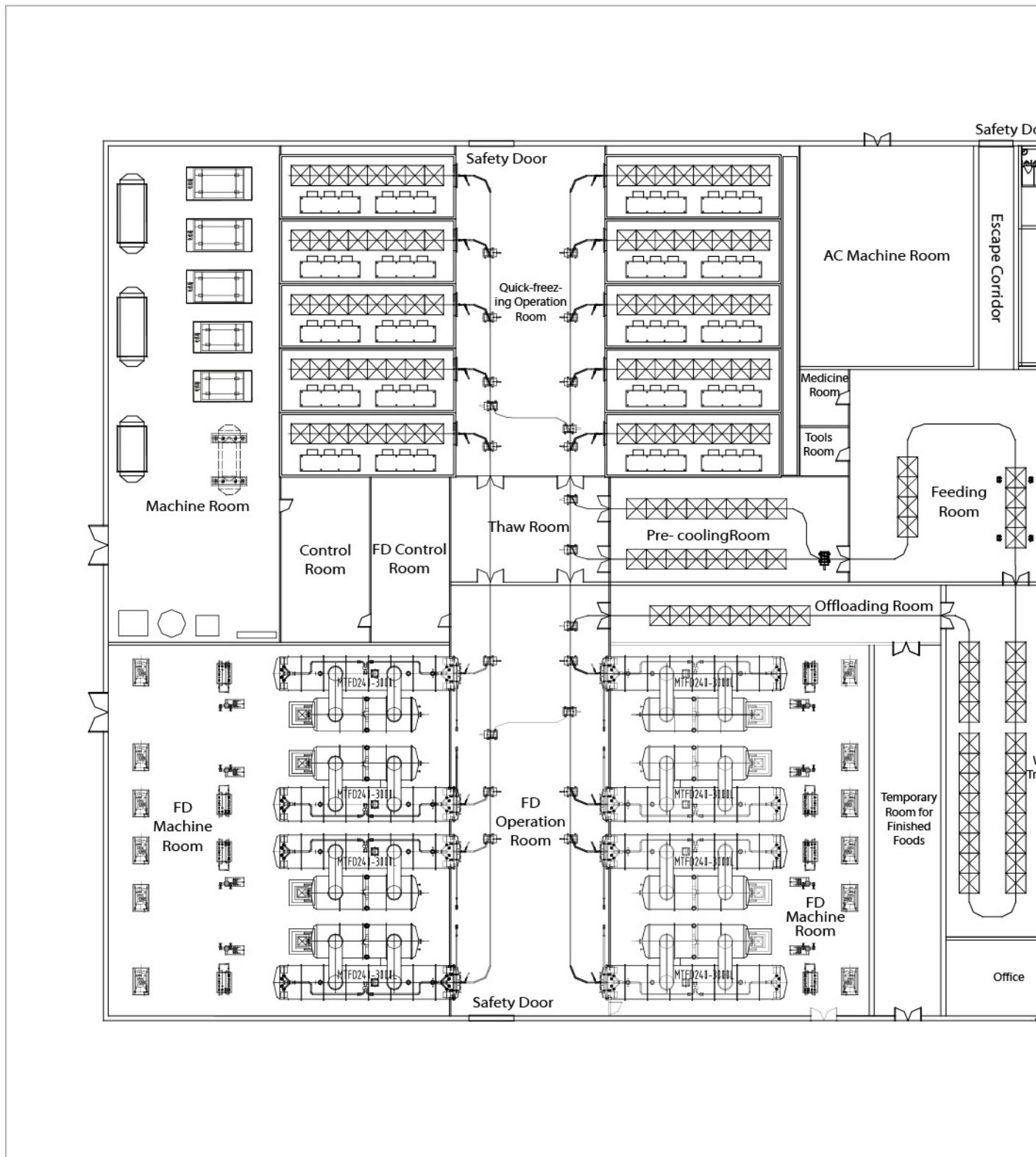


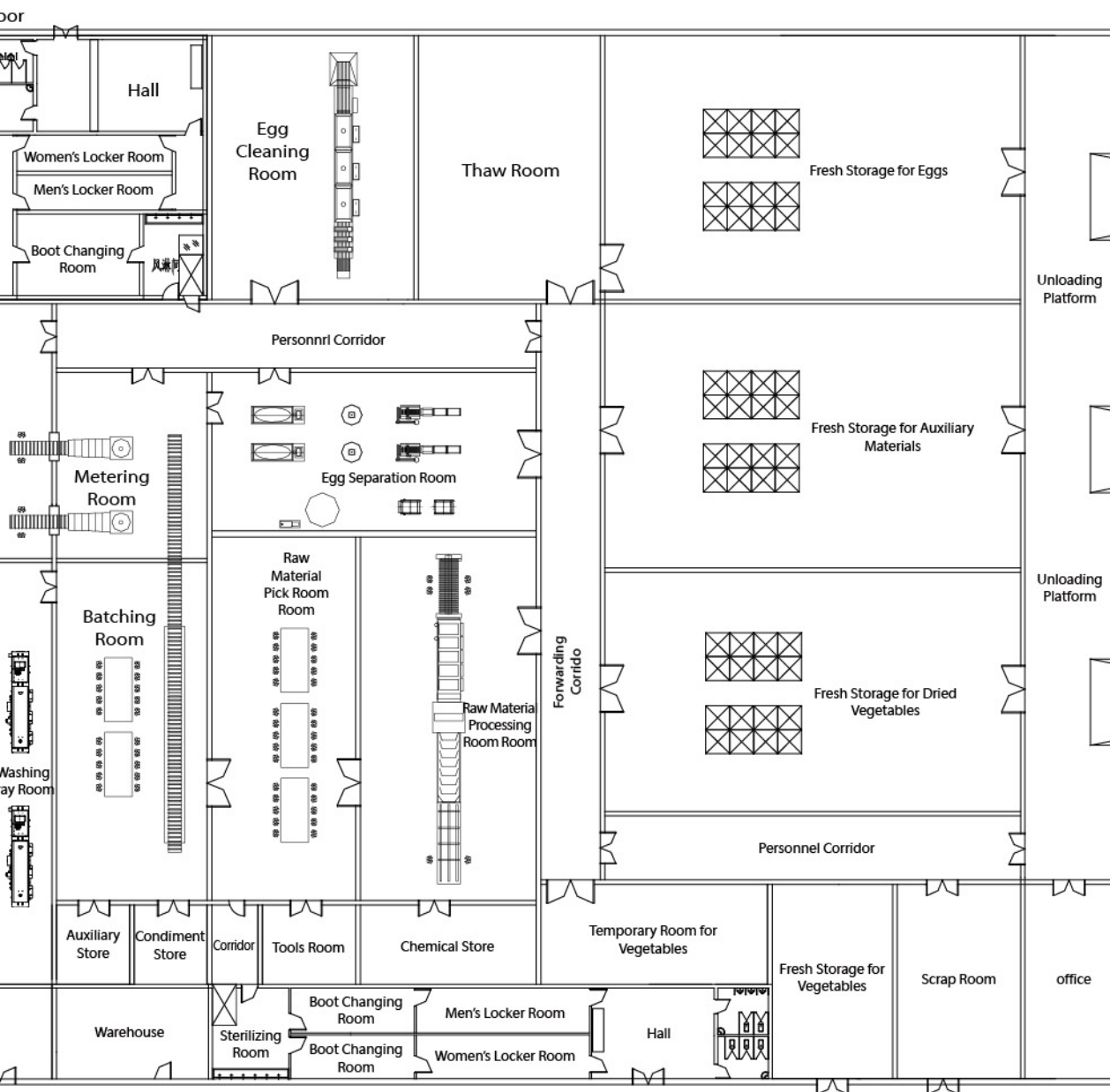
## FD Layout Plan for Fruits and Vegetables





## FD Layout Plan for Soup Pieces







**MICC**  
冰轮智汇云





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# 让温度更有温度

BEYOND JUST TEMPERATURE



Project  
Planning



Technical Consult-  
ing



Engineering  
Design



Complete  
Equipment



Installation and  
Commissioning



Employee  
Training



System Mainte-  
nance



System Diagnostic  
Upgrade



Contract Energy  
Management

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