

Travaglini





Travaglini was established in Milan in 1950, thanks to its founding father Travaglini Arnaldo. Since the beginning our company produced avant-garde equipment in the planning, in the production and in the supervision of air conditioning equipment for smoking, fermenting and drying systems for sausages and raw hams.

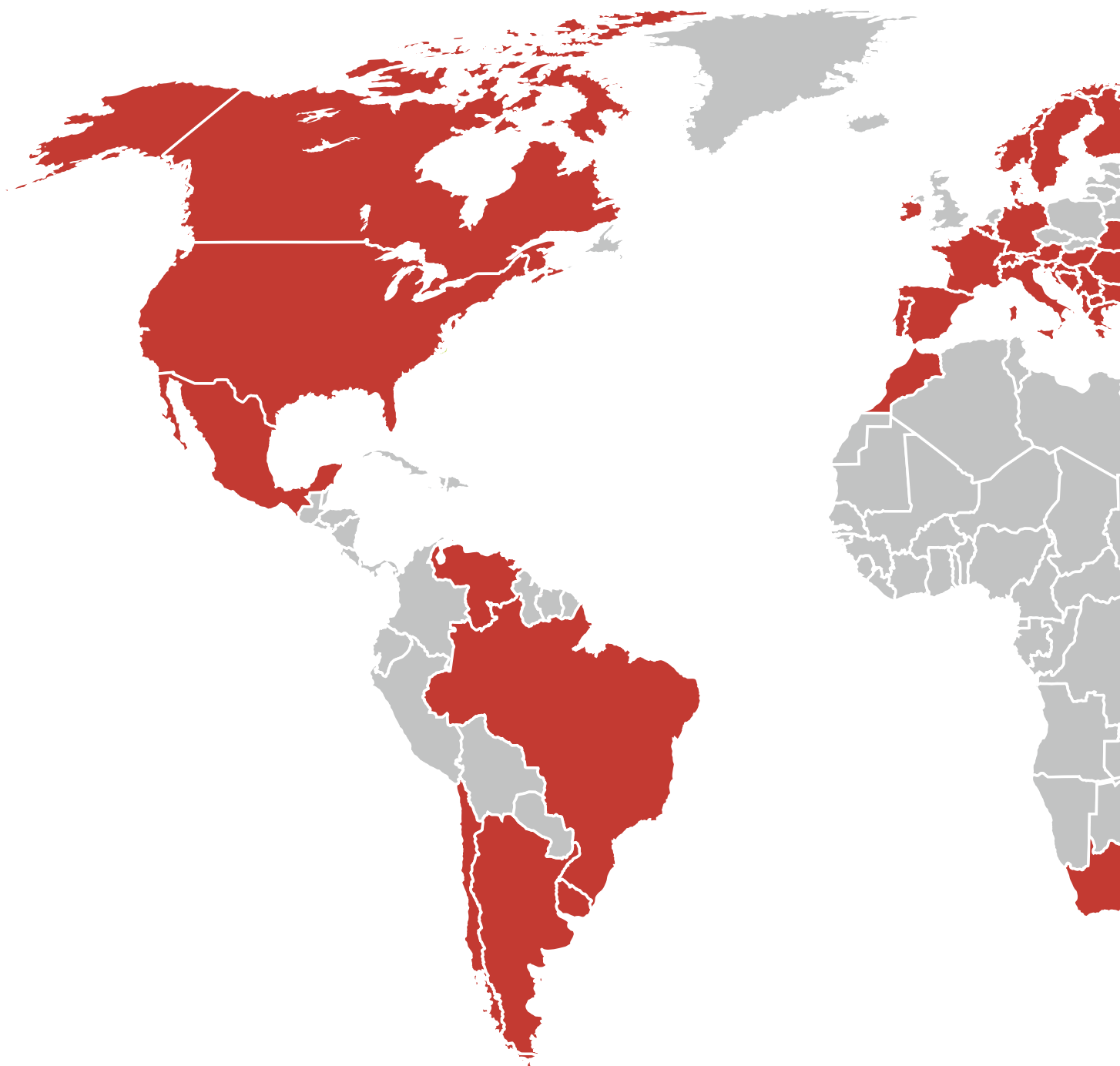
Thanks to the reconstruction of the Italian food industry our company grew acquiring more and more market shares both in Italy and abroad. Between 1957 and 1965, Travaglini company started working first in neighbour states like France, Switzerland and Austria and then also in Spain and Greece.

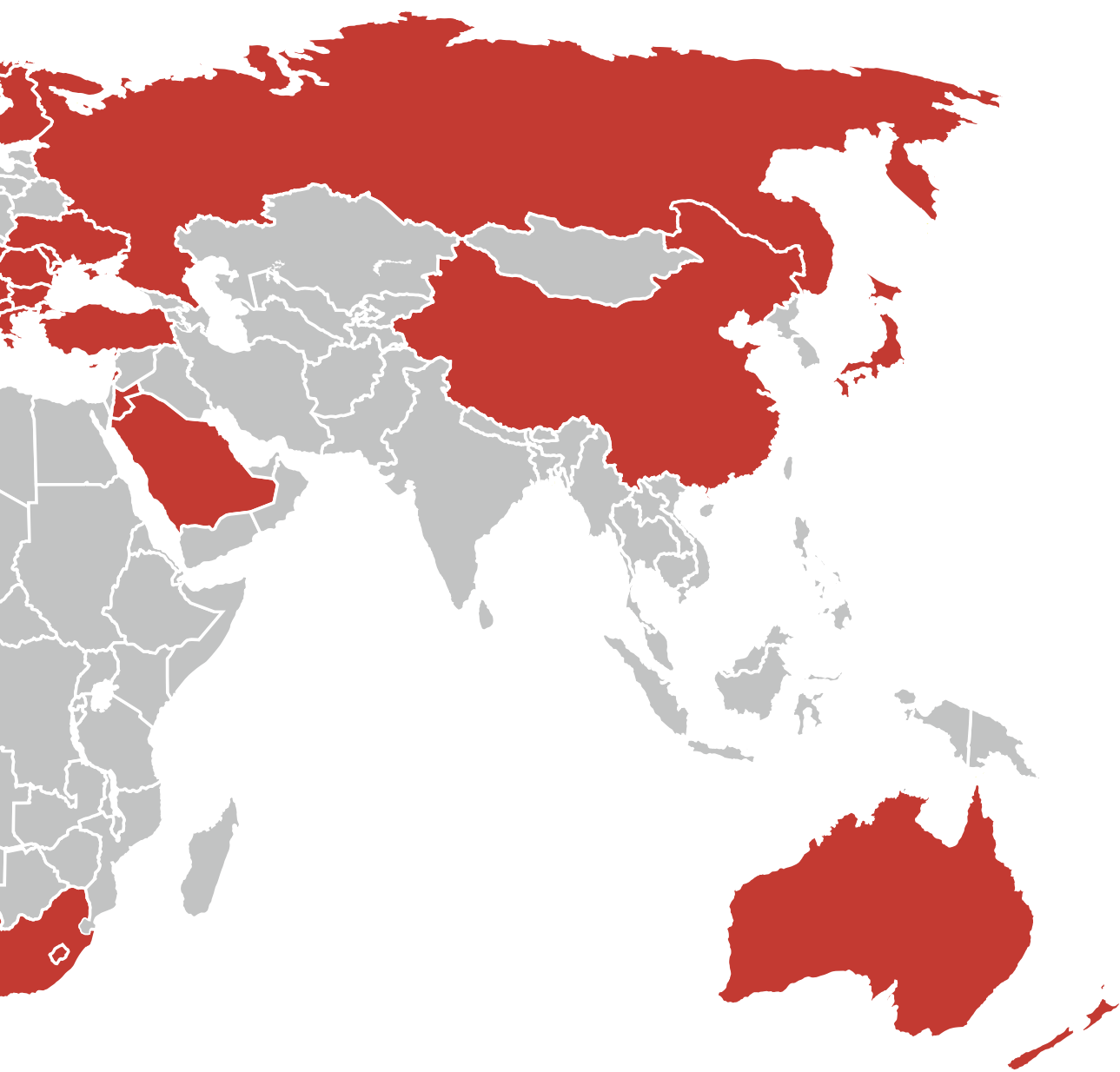
After the founding father death in 1965 Travaglini Arnaldo Company was founded by Mrs Lidia, Mr Roberto and Mr Paolo Travaglini. During the 70s the introduction in new foreign markets like Canada, United States, South America, Australia, ex URSS and other countries of the east Europe continued.

The experience and technical researches for technological development in meat industry, allowed our company to put on the global market a range of equipment, able to satisfy the requirements of our customers.

Today, on the third generation, Travaglini S.p.A. is a leader company in planning and production of smoking, fermenting and drying equipment for meat, cheese and fish industry.

## TRAVAGLINI IN THE WORLD







## Travaglini S.p.A.: more than sixty years in food service

Since 1950, we have been the world's leader in the manufacturing of drying, smoking, and aging systems for cured meat. Through the professional experience gained by our specialists, we are capable to satisfy any production request to design single machines or entire plants using the most advanced knowledge of technology and informatic. Throughout the years we have developed an efficient customer service, supporting our customers through to the post-sale phase, and we are directly responsible for the assembly, testing and maintenance of our systems all over the world.

Thanks to our highly qualified technological services, we offer state-of-the-art technologies, always standing by our customers to solve even the most complex production problems.

Our core business is to design and build:

- smoking, fermenting and drying rooms for sausages and raw hams;
- clean rooms and air conditioning systems;
- stoves for the production of mortadella;
- thawing systems for meats and other food products;
- pasteurizers, spiral and tunnel freezers;
- eco-friendly Freon refrigeration cold stores, ammonia and glycol refrigeration;
- climatic lines for cheese and fish products.

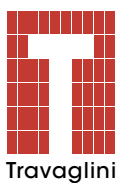
Our technicians' constant presence at our customers' plants guarantees the development of systems and research toward increasingly advanced technologies. For this reason, Travaglini systems are known and appreciated all over the world, and our customers are our best reference.

Travaglini S.p.A. is UNI EN ISO 9001:2008 certified.



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**EQUIPMENT FOR  
FERMENTING AND AGING  
OF SALAMI**





Since 1950, **Travaglini S.p.A.** has been the leading company in the manufacturing of drying, smoking, and fermenting equipment for salami, thanks to the experience that we have acquired through cooperation with the world's most important cured meat producers.

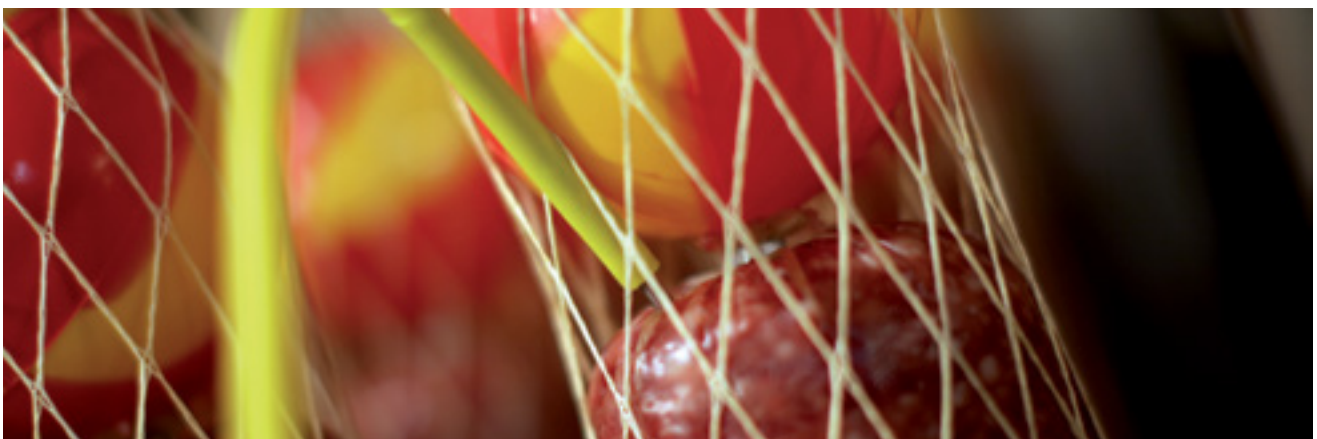
Our technologies, together with skills of our experts, support the customer in any problem connected to drying of salami in all their specific applications. Specifically:

#### **Better fermentation control**

Thanks to the combination of the installed cooling and heating power, it is possible to remove a noticeable amount of water from the product during the first hours of the fermenting process even at relatively low temperatures. In this way, water activity is reduced, fermentation is controlled, and negative effects from acidity are prevented.

#### **Minimal risk of crust formation**

The risk of crust formation is practically eliminated because the equipment is controlled by the moisture released by the product. The working phases during which the product's surface is dried are alternated with resting phases that allow it to "wake up", allowing moisture from inside of the product to be released.



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## Uniform shrinkage

The distribution of air inside the room must be as uniform as possible in all individual areas in order to obtain a homogeneous product. For this reason, as the result of the technical experience that we have acquired over the course of time, we have designed different air distribution systems according to the loading system used:

- "Turbo" systems, in which the air is sent into the room by two side wall ducts equipped with special conical nozzles, and air is returned through ceiling ducts with micro-adjusting valves. Even for equipment taller than 4 meters it is possible to control air quality (temperature and relative humidity) inside the room with a probe (optional) placed in the inlet duct, rather than using a system that inverts air circulation, in which the inlet ducts are also return ducts and vice versa;
- equipment with circular shape ducts, in which air is distributed with ceiling inlet ducts through a circular section and properly

dimensioned holes. Air is returned through grids placed directly on the air treatment unit, or through air return ducts;

- systems with blower walls in which the air is distributed via two walls, powered by a treatment unit which can alternate the supply and return of air flow. In this way, the product enters into contact with a suitable horizontal air flow.

## Air regulation

The system offered by Travaglini S.p.A. consists of a T-shaped duct, in which is installed an electric actuator, permitting the movement of two opposed blade dampers.

Compared with simpler and inaccurate systems with flag dampers and circular actuators, this solution offers the advantage of gradually modulating the air flow.

In addition to this, the new generation linear actuator (also with encoder), controlled by our programmable electrical card, allows:







- to regulate the room's transverse cross-flow speed, in order for air to flow over the product more uniformly;
- to regulate actuator speed, in order to allow the air to fill the inlet ducts correctly and uniformly, achieving the same air quantity for all nozzles;
- to adjust the actuator extension range, optimizing air distribution according to the width of the room;
- to make one or more intermediate stops of the air flow within the room, which can be programmed directly in our computerized control unit which manages the system.

### Computerized system

Our computerized control and management system, in addition to monitoring temperature and relative humidity, allows:

- to set predefined programmes;
- to control the fluid temperature, optimizing shrinkage;

- to record the graphical trending of different variables and display on a single screen (temperature, relative humidity, etc.);
- to verify the exact progression of the entire maturing process.

Furthermore, to allow for various functions to be centrally supervised, we have designed a software program for this purpose that allows to monitor and manage system alarms, to collect and graphically displayed the rooms' individual data, remote programming, remote support, and automatic centralised control for better management of energy consumption.





## Energy savings

### Heat recovery:

our system allows to recover the total condensation heat transferred during the refrigeration cycle. Therefore, when the post-heating demand coincides with requirement for cold, there is hardly any need to use external heating sources.

Furthermore, hot water around 40–45°C can be produced with a desuperheater (optionally available) which can be used for other processing systems as well as other plant needs.

### Enthalpy:

the enthalpy system utilizes the dehumidifying power of outside air for as long as possible. Our system is based on algorithms that allow to use outside air even when one of the specific values (temperature and relative humidity) seems far from the required values.

### Economizer:

in systems with an independent refrigeration unit, there is a sub-cooling system that guarantees a refrigeration capacity that is 15–18% greater than the absorbed electrical potential.

### High efficiency motors (IE2–IE3):

increase the system's output, reducing electrical consumption.

### Inverter:

frequency regulators, installed on the motor of centrifugal fans and/or compressors, that increase or reduce their rpm in order to improve their efficiency if process and loading conditions change.

### Direct coupling motor/fan:

this particular technical solution, combined with the use of an inverter, allows for a reduction in the system's electrical consumption, optimizing its regulation.

### Modulation of cooling and heating valves:

to improve system performance in relation to the actual needs of the product during the various phases of maturation maturing.

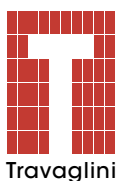
### Hot gas defrost system:

allows to defrost the cooling coil better and more quickly, which consequently saves energy.



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**SYSTEMS FOR  
SALTING, CURING, DRYING  
AND AGEING OF RAW HAM**





Since 1950, **Travaglini S.p.A.** has been a leading company in the development of equipment for **salting, curing, drying, pre-ageing and ageing rooms for raw ham**, thanks to the experience acquired through cooperation with the world's most important cured ham producers.

Our technologies, along with the skills of our experts help support the customer in solving any problem related to the stages of producing raw ham. Specifically:

### Salting room

The salting system is composed by ceiling mounted air exchangers and convectors made of ABS with conveyors that contain a hot water coil, installed in the centre or on the side walls of the room. As an alternative to this, however, there are some installations where it is possible to utilize a ventilated salting room, with special circular ducts and an air treatment unit. Temperature and relative humidity control are essential for proper absorption of sodium chloride. The salting period varies from 10 to 21 days according to the weight of the raw hams.

### Pre-curing room

We have developed a revolutionary ventilation system for this equipment: the air is distributed into the room through two ducts mounted on the side walls, complete with conical nozzles, properly dimensioned for this purpose. A linear actuator and damper system continuously regulate flow of air into the two inlet ducts in order to obtain a precise flow of air that moves constantly within the room and ensures a better drying of the critical "best



end" portion of the meat. It is also possible to add intermediate stops and to decide their duration. Suction ducts are mounted to the ceiling where air flow is controlled by micro-adjusting valves. This kind of system is designed to operate at a low relative humidity, to obtain a high dehydration of the ham at low temperature, thus preventing bacteria from developing and allowing the salt to penetrate into the heart of the raw ham.

This is the most delicate and important phase. The pre-curing period varies from 2 to 3 weeks according to the type of ham.

### **Curing room**

This kind of equipment is specifically designed to operate at low temperature and relative humidity, allowing a gradual dehydration of the product and reducing the risk of crust formation.

The curing period varies from 5 to 12 weeks according to the type of ham.

### **Drying room**

This stage varies from 1 to 2 weeks and allows to increase the internal temperature of the product in order to begin enzymatic processes.

### **Pre-ageing room**

This stage varies from 3 to 12 weeks and allows the product to be further dehydrated in order to guarantee that it can be safely stored.

### **Ageing room**

The ageing equipment is designed to maintain temperature and control of relative humidity at such a level in order to allow the product to develop its typical flavour.

### **Computerized system**

Our computerized control and management system, in addition to monitoring temperature and relative humidity, allows:

- to set predefined programmes;
- to control the fluid temperature, optimizing shrinkage;
- to record the graphical trending of different variables and display on a single screen (temperature, relative humidity, etc.);
- to verify the exact progression of the entire maturing process.







Furthermore, to allow for various functions to be centrally supervised, we have designed a software program for this purpose that allows to monitor and manage system alarms, to collect and graphically displayed the rooms' individual data, remote programming, remote support, and automatic centralised control for better management of energy consumption.

## Energy savings

### Heat recovery:

our system allows to recover the total condensation heat transferred during the refrigeration cycle. Therefore, when the post-heating demand coincides with requirement for cold, there is hardly any need to use external heating sources. Furthermore, hot water around 40–45°C can be produced with a desuperheater (optionally available) which can be used for other processing systems as well as other plant needs.

### Enthalpy:

the enthalpy system utilizes the dehumidifying power of outside air for as long as possible. Our system is based on algorithms that allow to use outside air even when one of the specific values (temperature and relative humidity) seems far from the required values.

### Economizer:

in systems with an independent refrigeration unit, there is a sub-cooling system that guarantees a refrigeration capacity that is 15–18% greater than the absorbed electrical potential.

### High efficiency motors (IE2–IE3):

increase the system's output, reducing electrical consumption.

### Inverter:

frequency regulators, installed on the motor of centrifugal fans and/or compressors, that increase or reduce their rpm in order to improve their efficiency if process and loading conditions change.





**Direct coupling motor/fan:**

this particular technical solution, combined with the use of an inverter, allows for a reduction in the system's electrical consumption, optimizing its regulation.

**Modulation of cooling and heating valves:**

to improve system performance in relation to the actual needs of the product during the various phases of maturation maturing.

**Hot gas defrost system:**

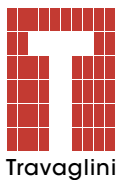
allows to defrost the cooling coil better and more quickly, which consequently saves energy.





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**EQUIPMENT FOR  
SMOKED PRODUCTS**



Since 1950, **Travaglini S.p.A.** has been the leading company in the manufacturing of drying, smoking, and fermenting equipment for cured meat, thanks to the experience that we have acquired through cooperation with the world's most important salami producers.

Our technologies together with skills of our experts support the customer in any problem connected to smoked products in all their specific applications. Specifically:

#### **Better fermentation control**

Thanks to the combination of the installed cooling and heating power, it is possible to remove a noticeable amount of water from the product during the first hours of the fermenting process even at relatively low temperatures. In this way, water activity is reduced, fermentation is controlled, and negative effects from acidity are prevented.

#### **Less air pollution**

Reduction of air pollution is guaranteed through a programmable smoke recycling system inside the room and through a special filter-trap that captures the tar content of smoke before it enters the smokehouse.

Our equipment have an optional by-pass device with dampers that prevents the passage of smoke through the smoking cabinet. This guarantees that the equipment are more efficient and the costs of coil cleaning are lower.

Moreover, it is possible to request specific filters/purifiers that can be installed on chimneys, in order to reduce air pollution.





### Minimal risk of crust formation

The risk of crust formation is practically eliminated because the equipment is controlled by the moisture released by the product. The working phases during which the product's surface is dried are alternated with resting phases that allow it to "wake up", allowing moisture from inside of the product to be released.

### Uniform shrinkage

The distribution of air inside the room must be as uniform as possible in all individual areas in order to obtain a homogeneous product.

For this reason, as the result of the technical experience that we have acquired over the course of time, we have designed different air distribution systems according to the loading system used:

- "Turbo" systems, in which the air is sent into the room by two side wall ducts equipped with special conical nozzles, and air is returned through ceiling ducts with micro-adjusting valves. Even for equipment taller than 4 meters it is possible to control air quality (temperature and relative humidity) inside the room with a probe (optional) placed in the inlet duct, rather than using a system that inverts air circulation, in which the inlet ducts are also return ducts and vice versa;
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### Air regulation

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- to adjust the actuator extension range, optimizing air distribution according to the width of the room;
- to make one or more intermediate stops of the air flow within the room, which can be programmed directly in our computerized control unit which manages the system.

### Cleaning system

An automatic or manual cleaning system allows for a perfect cleaning of the centrifugal fan, modulating dumpers, filter-trap, supply ducts (equipped with openings) and return ducts (that can be opened).

## Computerized system

Our computerized control and management system, in addition to monitoring temperature and relative humidity, allows:

- to set predefined programmes;
- to control the fluid temperature, optimizing shrinkage;
- to record the graphical trending of different variables and display on a single screen (temperature, relative humidity, etc.);
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Furthermore, to allow for various functions to be centrally supervised, we have designed a software program for this purpose that allows to monitor and manage system alarms, to collect and graphically displayed the rooms' individual data, remote programming, remote support, and automatic centralised control for better management of energy consumption.

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### High efficiency motors (IE2–IE3):

increase the system's output, reducing electrical consumption.

### Inverter:

frequency regulators, installed on the motor of centrifugal fans and/or compressors, that increase or reduce their rpm in order to improve their efficiency if process and loading conditions change.

### Direct coupling motor/fan:

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### Modulation of cooling and heating valves:

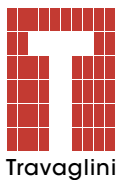
to improve system performance in relation to the actual needs of the product during the various phases of maturation maturing.

### Hot gas defrost system:

allows to defrost the cooling coil better and more quickly, which consequently saves energy.







**CLEAN ROOMS**



Since 1950, **Travaglini S.p.A.** has been a worldwide leader in the manufacturing of equipment for the production of sausages, hams and dairy products. Our company is a recognized and a qualified supplier of advanced conditioning and air treatment systems and clean rooms.

Thanks to our knowledge and experience of technological processes and their relative hygienic challenges, we are able to design and produce advanced equipment and to supply the necessary know-how and assistance to answer our customers' production needs with adequate solutions.

### Definition of clean room

A clean room is a room in which the concentration of airborne particles is controlled. These rooms are built for minimizing the introduction, generation, and retention of pollutant particles within. The contamination of products due to dust, mold, and airborne particles reduces the quality and the shelf-life of the products themselves.

### Cause of impurities

The following are the principal causes of air contamination:

- people that are the principal vehicle of contamination and with one small movement can release several million of particles of various sizes;
- products, especially when packaged or left in dust;
- production machinery and liquids (pneumatic equipment with open drains, lubricating oils, condensation drops, drains without traps, etc.);
- production, cleaning, and disinfection processes;
- biological contamination through mold, yeast and bacteria present in the air.

### Product protection

Protecting products from contamination by harmful airborne particles means avoiding that they come into contact with the air itself. This is not possible during all stages of production and is extremely difficult at the same time.

However, the concept of protection can be interpreted in a different way: not to isolate the product from the surrounding ambient, but instead to place it in a high quality environment, with controlled hygienic conditions, and with particularly pure air to promote protection of the product.



## Classification of clean rooms

In the table below you can find a classification of air purity (filtration grade) in conditioned rooms according to the Federal Standard 209 E, Federal Standard 290 D and ISO 14644-1 that are taken as reference classifying rooms.

Moreover, since the introduction of Fed.Std.209D, it has been specified that the conditions that must be tested in order to establish environmental contamination classes are:

- as built clean room
- at rest clean room
- operational clean room

## Filters

For each installation class, filters with different efficiency levels are used. Air filtration takes place progressively; lower-protection filters are placed before those that have a higher protection. Progressive air filtration prevents damage to the higher-protection filters and their rapid contamination.

## Working environment characteristics

- limited dimensions in order to guarantee a healthy work environment;
- work areas must be placed as far as possible from potential sources of contamination;
- the production cycle must flow from the least sterile to the most sterile room;
- elimination/reduction of turbulence within the clean rooms;
- easy access to all areas of the clean room for cleaning;
- accessories that comply with international safety and hygiene regulations.

## Classification

ISO 14644-1	US. FED STD 209D	US. FED STD 209E
1		
2		
3	1	M1.5
4	10	M2.5
5	100	M3.5
6	1.000	M4.5
7	10.000	M5.5
8	100.000	M6.5
9		

Values indicate the highest level of allowable particles with a maximum diameter of  $0,5 \mu\text{m}$  ( $0,5 \mu\text{m} = 0,0005 \text{ mm}$ ) per cubic foot (28,3 litres).

### ► Example

There are not more than 10 particles per cubic foot (28,3 litres). That is, that corresponds more or less to the proportions of the head of a pin with respect to that of a soccer field. In comparison: a cubic meter regularly contains 1-5 million particles.



## Structure and operation of a clean room

A basic feature of clean rooms is that they are often enclosed in areas of limited size which are optimized for production requirements. Air distribution inside a clean room can be implemented in different ways, and this, together with the different grades of filtration, determines the level of protection against product contamination.

Here you can find possible methods of air distribution:

1. unidirectional vertical flow, filters are placed in the ceiling and the air is recovered from the lower parts of the room or from the perforated flooring (figure 1a); in this case the clean working area is located in the upper part of the room;
2. unidirectional horizontal flow, the air enters from wall filters and is recovered by localized grates; in this case, the clean work area is located between the filters that generate the flow and the first source of contamination (figure 1b);
3. non-unidirectional flow, the clean working area is the whole room (figure 2a);
4. mixed flow, this is a situation in which unidirectional and non-unidirectional flows coexist (figure 2b).

Therefore, looking at this classification we understand how choosing and properly placing filters is fundamental in the design of a clean room.

Figure 1a

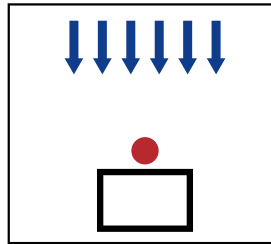


Figure 1b

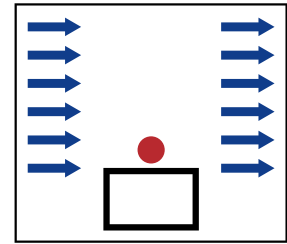


Figure 2a

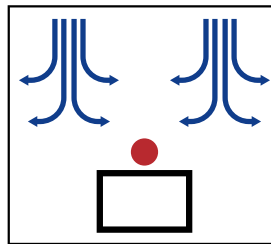
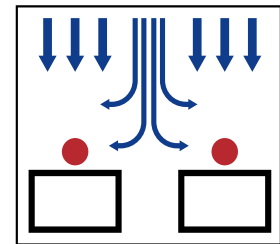


Figure 2b





### Environmental parameters in clean rooms

The most important environmental parameters are those that must be kept under control for the product's quality, packaging, and waste material, energy consumption, machine functionality, and last but not least, the workers' comfort. These parameters are:

- temperature and humidity: humidity control, besides being fundamental for product quality, is also of great importance for problems in relation to corrosion, condensation on work surfaces, and the reduction of electrostatic charges;
- differential pressures: all rooms must be kept at static pressures that are sufficiently higher than atmospheric pressure in order to avoid any type of infiltration; any expulsion of air from the room must be counterbalanced by new air input in order to maintain the environmental pressure value;
- lighting: the level of lighting, its uniformity, and the colour of the light must be controlled;
- noise and vibration: can be dangerous both for the workers and for the equipment itself.

### Connection between different working areas

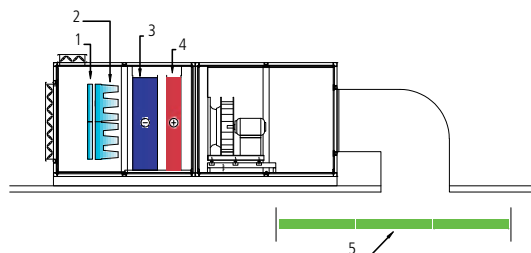
- openings between the various environments with controlled atmosphere must be limited as much as possible;
- entries and exits must be made using "Air locks" in order to minimize contamination, and furthermore, to maintain the differential pressures between the various environments.





## Air treatment systems

### Systems Class 100



Filter:

- EU3/EU4 level filters
- EU9 pocket filters at the entrance.

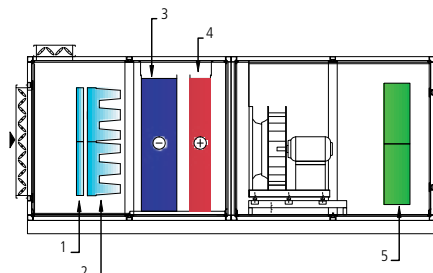
Distribution from the ceiling:

- with EU14 box filtering

Air departure from the environment:

- suction through wall grilles

### Systems Class 10.000



Filter:

- EU3/EU4 level filters
- EU8 pocket filters at the entrance
- EU13 absolute filters at the exit

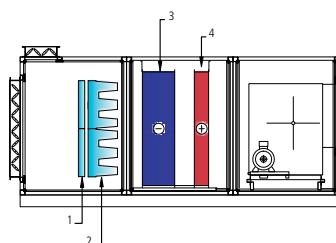
Distribution from the ceiling:

- with finely permeable fabric channels

Air departure from the environment:

- through ceiling grilles

### Systems Class 100.000



Filter:

- EU9 pocket filter
- EU3/EU4 level filter

Distribution from the ceiling:

- with ceiling socket
- with fabric channels

Air departure from the environment:

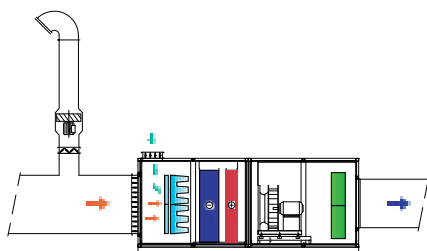
- through ceiling grilles

## Working phases

The equipment, besides its normal function as an air conditioning unit, provides the expulsion of humid air generated while the work environment is being washed. The air treatment unit in this

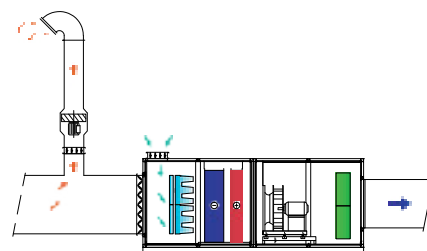
phase provides the introduction of hot air to facilitate the drying of surfaces and equipment.

The equipment is designed for working in four distinct phases:



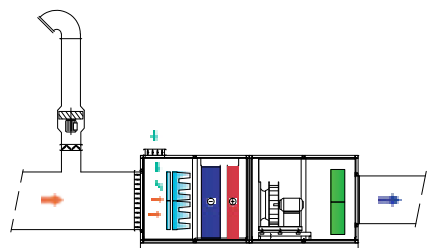
#### 1. Production phase:

temperature and ambient humidity is checked



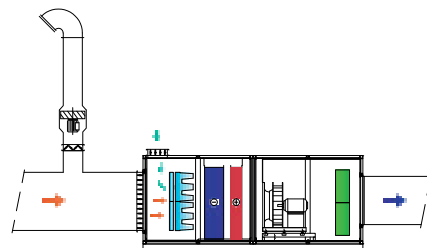
#### 2. Cleaning phase:

at the end of the working phase, the necessary cleaning operations are carried out in the room



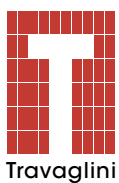
#### 3. Drying phase:

after washing, the room is dried



#### 4. Maintenance phase:

the period following the drying phase and preceding a new working phase



**THAWING SYSTEMS**



Since 1950, **Travaglini S.p.A.** has been the leading company in the designing and developing of **thawing systems for all kinds of meats and various fish products.**

We guarantee a perfect temperature uniformity in all points inside the room, with reduced shrinkage throughout the entire thawing cycle, which may vary from 12 to 36 hours depending on the size of the product.

#### **Points of strength of our equipment**

- air treatment unit, hot and cold coils, fan, inlet and return ducts in stainless steel;
- processes controlled by a microprocessor via temperature and relative humidity sensors in the room. Probes inserted in the core and on the surface of the product are used to monitor temperatures and changes in environmental conditions in real time, and to consequently regulate the functioning of the system;
- heating/humidification system with saturated steam in the room to increase efficiency in terms of the product's heat transfer coefficient uniformity of treatment;
- constant microbial content throughout the entire process through the presence of steam;
- microbiological product safety and a hygienic process that guarantee product shelf life;
- adjustable temperature from -5°C/+20°C and relative humidity up to 95–100%;
- at the end of the cycle our equipment works as a refrigeration room to preserve thawed products;
- reduced shrinkage, compared to other thawing systems;
- reduced loss of sarcoplasmic (water soluble) proteins;
- low energy cost;
- high loading capacity (over 1000 kg/mq);
- none of the disadvantages of traditional immersion thawing systems such as excessive use of water and waste water draining.





### **Uniform shrinkage**

In “Turbo” equipment, air distribution is controlled by two side wall ducts equipped with proportionally dimensioned conical nozzles. A linear actuator and damper system continuously regulate flow of air into the two inlet ducts in order to obtain a precise flow of air that moves constantly within the room. Air return is controlled by ceiling ducts equipped with micro-adjusting valves.

### **Computerized system**

Our computerized control and management system, in addition to monitoring temperature and relative humidity, allows:

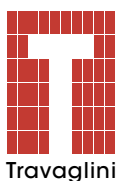
- to set predefined programmes;
- to control the fluid temperature, optimizing shrinkage;
- to record the graphical trending of different variables and display on a single screen (temperature, relative humidity, etc.);
- to verify the exact progression of the entire maturing process.

Furthermore, to allow for various functions to be centrally supervised, we have designed a software program for this purpose that allows to monitor and manage system alarms, to collect and graphically displayed the rooms’ individual data, remote programming, remote support, and automatic centralised control for better management of energy consumption.



*Your ideas. Our solutions.*





EQUIPMENT FOR **SALTING,**  
**DRYING AND SMOKING**  
**FISH PRODUCTS**





**Travaglini S.p.A. leader in meat industry, also produce equipment for the salting, drying and smoking of fish products.**

Through our professional experience in technological development over the course of time, with the help of our customers all around the world, we can satisfy any production need in the fish industry with our equipment. Specifically:

### **Salting room**

In this phase the product is laid horizontally and completely covered with salt. The equipment is composed by ceiling mounted air exchangers and convectors made of ABS with conveyors that contain a hot water coil, installed in the centre or on the side walls of the room.

### **Drying and smoking room**

The aim of this phase is to make the salt penetrate while drying the product at the same time. In this way, the salt enters inside the cell via osmosis, causing the water leaving, which must be removed quickly in order to avoid problems caused by bacteria. Equipment with round vertical ducts was also designed to satisfy customers who dry products via horizontal loading. The drying phase is very important and can be carried out at a range of different temperatures.

### **Less air pollution**

Reduction of air pollution is guaranteed through a programmable smoke recycling system inside the room and through a special filter-trap that captures the tar content of smoke before it enters the smokehouse.

Our equipment have an optional by-pass device with dampers that prevents the passage of smoke through the smoking cabinet. This guarantees that the equipment are more efficient and the costs of coil cleaning are lower.

Moreover, it is possible to request specific filters/purifiers that can be installed on chimneys, in order to reduce air pollution.



### Minimal risk of crust formation

The risk of crust formation is practically eliminated because the equipment is controlled by the moisture released by the product. Fish filets come into contact with air flow that allows to perfectly dehydrated with the desired shrinkage the surface. The processing phases during which the product's surface is dried are alternated automatically with resting phases that allow it to "wake up".

### Computerized system

Our computerized control and management system, in addition to monitoring temperature and relative humidity, allows:

- to set predefined programmes;
- to control the fluid temperature, optimizing shrinkage;
- to record the graphical trending of different variables and display on a single screen (temperature, relative humidity, etc.);
- to verify the exact progression of the entire maturing process.

Furthermore, to allow for various functions to be centrally supervised, we have designed a software program for this purpose that allows to monitor and manage system alarms, to collect and

graphically displayed the rooms' individual data, remote programming, remote support, and automatic centralised control for better management of energy consumption.

### Uniform shrinkage

As a result of the technical experience that we have acquired over the course of time, we have designed different air distribution systems according to the loading systems used.

In the fish industry, for products that are loaded horizontally, air is distributed through vertical circular ducts, complete with proportionally-sized nozzles. The airflow within the room is continuously regulated in order to obtain a continuously moving precise airflow that moves from right to left and vice versa. In this way, every duct functions as both air supply and air return.

### Energy savings

Our equipment are designed to create the best possible result for the product, optimizing the consumption of cold and heat, and sensibly decreasing energy costs. Among our solutions we mention:



**Heat recovery:**

our system allows to recover the total condensation heat transferred during the refrigeration cycle. Therefore, when the post-heating demand coincides with requirement for cold, there is hardly any need to use external heating sources (this does not apply to cold drying equipment).

Furthermore, hot water around 40–45°C can be produced with a desuperheater (optionally available) which can be used for other processing systems as well as other plant needs.

**Enthalpy:**

the enthalpy system utilizes the dehumidifying power of outside air for as long as possible. Our system is based on algorithms that allow to use outside air even when one of the specific values (temperature and relative humidity) seems far from the required values.

**Economizer:**

in systems with an independent refrigeration unit, there is a sub-cooling system that guarantees a refrigeration capacity that is 15–18% greater than the absorbed electrical potential.

**High efficiency motors (IE2–IE3):**

increase the system's output, reducing electrical consumption.

**Inverter:**

frequency regulators, installed on the motor of centrifugal fans and/or compressors, that increase or reduce their rpm in order to improve their efficiency if process and loading conditions change.

**Direct coupling motor/fan:**

this particular technical solution, combined with the use of an inverter, allows for a reduction in the system's electrical consumption, optimizing its regulation.

**Modulation of cooling and heating valves:**

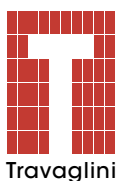
to improve system performance in relation to the actual needs of the product during the various phases of maturation maturing.

**Hot gas defrost system:**

allows to defrost the cooling coil better and more quickly, which consequently saves energy.

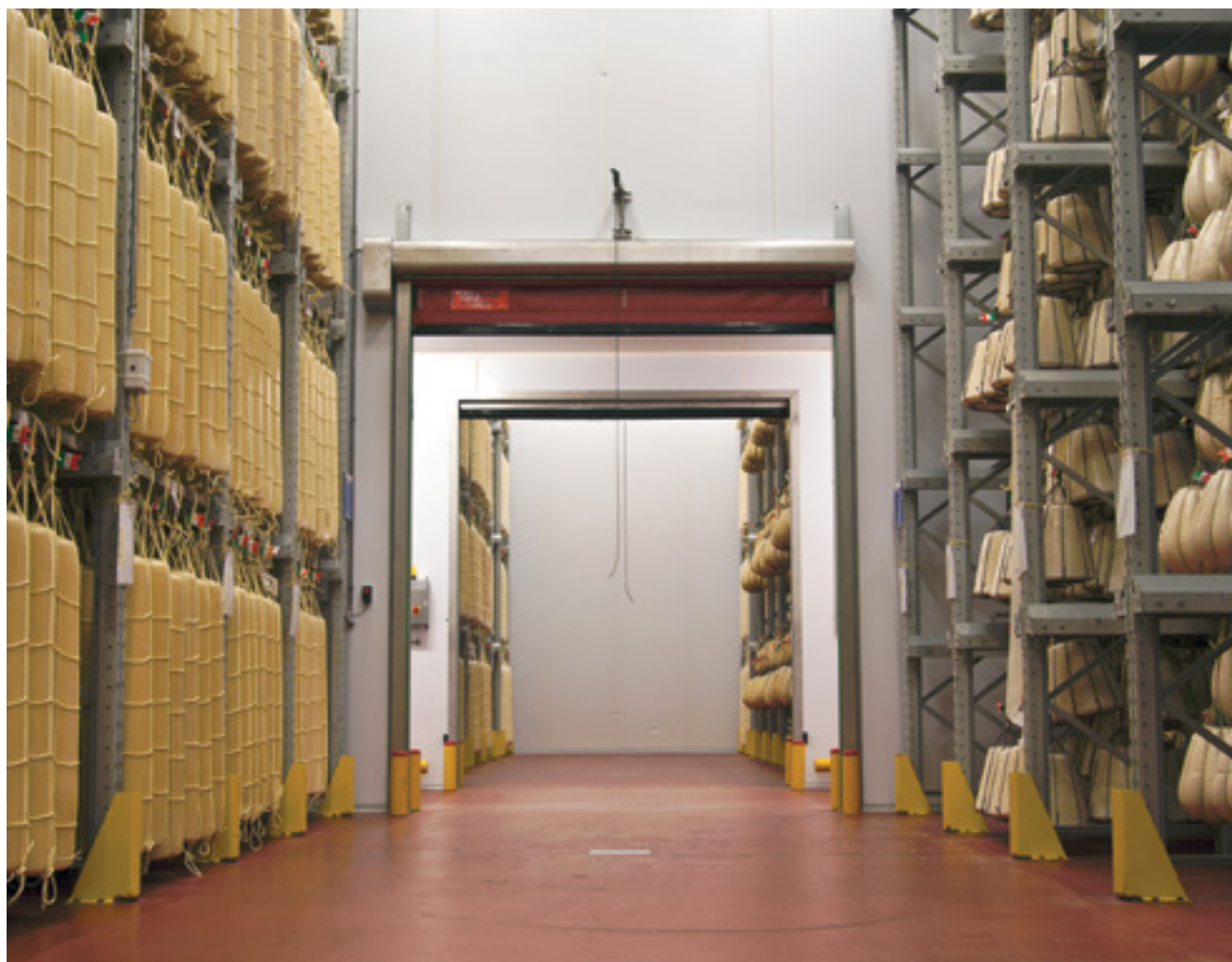






**EQUIPMENT FOR MATURING,  
DRYING AND CONDITIONING  
CHEESE PRODUCTS**





**Travaglini S.p.A., a leader in the meat industry, also produces equipment for the aging and maturing of cheese products.**

Through our professional experience acquired over years of technological development, with the help of our customers all around the world, we can satisfy the production requests of the companies in dairy industry. Specifically:

### **Maturing room**

The maturing phase is very important for the production of fresh and semi-fresh foods; its purpose is to allow the development of aroma and the taste of the cheese. Maturing rooms are composed by Sani-system in stainless steel with rounded corners, in order to allow for adequate sanitation.

Travaglini systems are designed to guarantee correct thermo hygrometer readings in each part of the cell, controlled gas creation (ammonia and carbon dioxide), and uniform air distribution through textile ducts in order to avoid excessive drying of the product's surface.

### **Ageing room**

Depending on the duration of this phase, it's possible to talk about medium (3–6 months) or long (more than 6 months) seasoning. Travaglini aging equipment maintain temperature and relative humidity so that they fall within such values in order to allow the development of the product's characteristic aroma.

Air is distributed into the room through ducts, which allow to achieve an uniform air flow on the product, controlled in function of the desired shrinkage.

Depending on the type of cheese or loading, it is possible to offer different solutions: equipment with round textile ducts, blowing walls or static exchangers. Normally cheeses are placed on special stackable racks or hung.



## Conditioning rooms

Travaglini S.p.A. has always focused on respecting ideal thermo hygrometric parameters in production, manufacturing and packaging areas. The need to sanitise these areas can also be considered with this goal. An example might be air treatment units, developed with technical specifications, such as circular angles, inclined planes, or washable materials, which allow for easy cleaning of the various components to remove dirt and residues.

## Computerized system

Our computerized control and management system, in addition to monitoring temperature and relative humidity, allows:

- to set predefined programmes;
- to control the fluid and the environmental temperature;
- to record the graphical trending of different variables and display on a single screen (temperature, relative humidity, etc.);
- to verify the exact progression of the entire maturing process.

Furthermore, to allow for various functions to be centrally supervised, we have designed a software program for this purpose that allows to monitor and manage system alarms, to collect and graphically displayed the rooms' individual data, remote programming, remote support, and automatic centralised control for better management of energy consumption.







## Energy savings

Our equipment are designed to create the best possible result for the product, optimizing the consumption of cold and heat, and sensibly decreasing energy costs. Among our solutions we mention:

### Heat recovery:

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### Enthalpy:

the enthalpy system utilizes the dehumidifying power of outside air for as long as possible. Our system is based on algorithms that allow to use outside air even when one of the specific values (temperature and relative humidity) seems far from the required values.

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### High efficiency motors (IE2–IE3):

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### Direct coupling motor/fan:

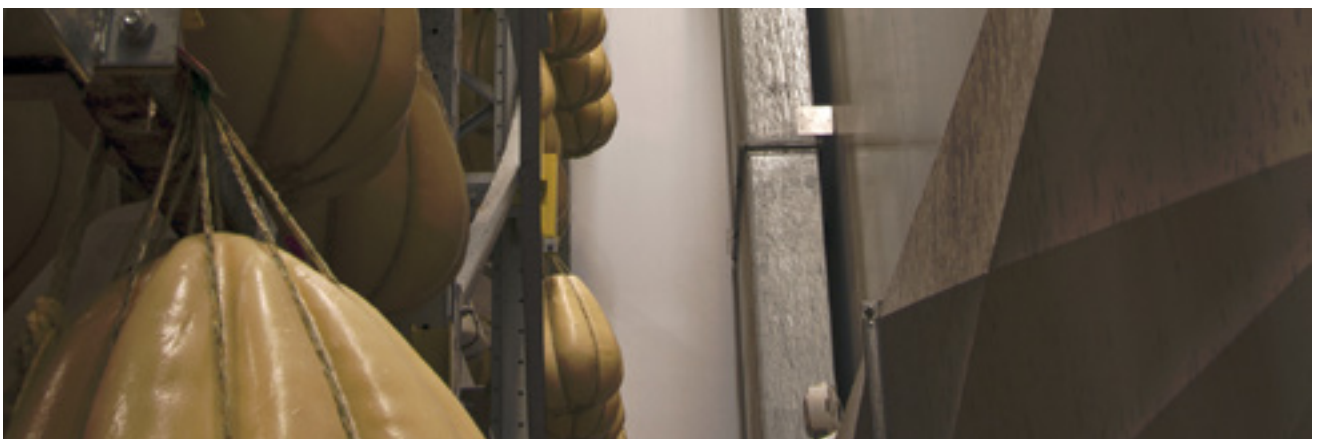
this particular technical solution, combined with the use of an inverter, allows for a reduction in the system's electrical consumption, optimizing its regulation.

### Modulation of cooling and heating valves:

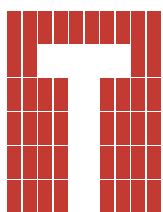
to improve system performance in relation to the actual needs of the product during the various phases of maturation maturing.

### Hot gas defrost system:

allows to defrost the cooling coil better and more quickly, which consequently saves energy.







Travaglini

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