



**INDUSTRIAL
REFRIGERATION PLANTS
AND CONDITIONING
FOR CURED MEAT**

Industrial applications
of the cold
Processing - seasoning - smoking.

MADEFRIGOR: MORE THAN 50 YEARS OF HISTORY



In the industrial refrigeration sector in Italy and worldwide, **Madefrigor** stands out for its solidity and dynamism. We are in fact a consolidated reality with over 50 years of activity in the Agri-food sector.

With our innovative systems, we realize environmentally friendly and energy-efficient projects. We have never lacked a strong **design dynamism** that has led to innovations such as the **Vertical Air System**.

Since the first years of activity, **Madefrigor** has distinguished itself for the search for cutting-edge solutions and today the production is oriented towards natural fluids: a green approach in the sale of industrial refrigeration systems.



ACCURATED DESIGN

Our technicians can solve various problems, thanks to a long design experience that can evaluate all the variables.

This results in a range of **products designed with a view to greater sustainability**; selecting the most suitable green refrigerant, in order to maximize performance within the agreed budget.

Madefrigor is composed of operators with different multi-specialized professionals, able to design plants based on the different needs of the customer.

SANITIZING AIR CONDITIONING AND CLEAN ROOMS

We design, build and install clean rooms for slicing cold cuts and sanitizable type air conditioning units. These have an internal structure made of thick AISI 304 stainless steel watertight chamber modules (15/10mm), manually welded to TIG.

The AISI 304 stainless steel carpentry and interior cladding are designed and constructed in such a way that they do not have projections, sharp edges or unattainable corners in which dirt could accumulate.

The inner corners are connected with a radius, allowing easy cleaning and disinfection. Filtration goes according to the needs of the premises.

The air, in clean room, is distributed with absolute filters and textile ducts.



PROCESSING PLANTS FOR HAM

A series of very important steps are required to produce a high quality ham. Technology can help with this, with systems designed for each of these stages:

SALTING OF THE PRODUCT: a properly designed plant in the thermo-hygrometric parameters contributes to the normal absorption of salt, therefore the period of stay in these cells varies with the weight of the ham



PRE-REST: after the salting phase, the ham is washed, dried and placed in the pre-rest cells. In the latter, working with very low humidity and temperature, dehydration is obtained and salt is helped to work, which will penetrate evenly inside, towards the center of the ham



DRYING: during this phase (the duration of which depends on the weight of the ham) the temperatures begin to rise to encourage the initiation of the ripening process

PRE-SEASONING: At this stage it becomes important to properly control the microclimate inside the room, so as to complete the dehydration of the product and increase the safety of the shelf-life



SEASONING: is the final stage of the process. With appropriate technologies, the control of temperature and humidity is guaranteed and the correct re-oxygenation of the environments is given. Constant parameters and air exchange are essential to develop, during the cycle, the flavor of the ham

COMPUTERIZED MANAGEMENT OF ALL PHASES: our plants are managed by PLC, which, in addition to managing all phases and constantly controlling the microclimate, provide that the operator can intervene on all variables depending on the needs of the product. The plant can also be remotely managed from other locations



PROCESSING PLANTS FOR DRYING AND SEASONING SAUSAGES

For 50 years, Madefrigor has been designing and manufacturing process systems for drying/stewing and curing cold cuts in its own workshop. These are two very important steps to achieve maximum product quality.

DRYING-STEWING: In this phase the acidification process takes place, which can be carried out at high temperature starting from 28 °C and then going down for quick acidification products. For long-life products, it is from 18 °C

SEASONING: second and last phase, where the control of the thermo-hygrometric parameters and the correct re-oxygenation inside the maturing room, become fundamental to develop the flavour of the product over time.

This process is characterized by a unique microclimate: 10/12° C with 60% humidity

The choice of maturing places and plants is fundamental for obtaining an excellent product. Our plants, designed for every particular need, guarantee constant control over the microclimate, excellent ventilation and the ideal maintenance of humidity, to trigger and encourage the growth of "good moulds" that contribute to the maturation of sausages





SMOKE IMPLANTS FOR SPECK-BACON ANATOMICAL PIECES

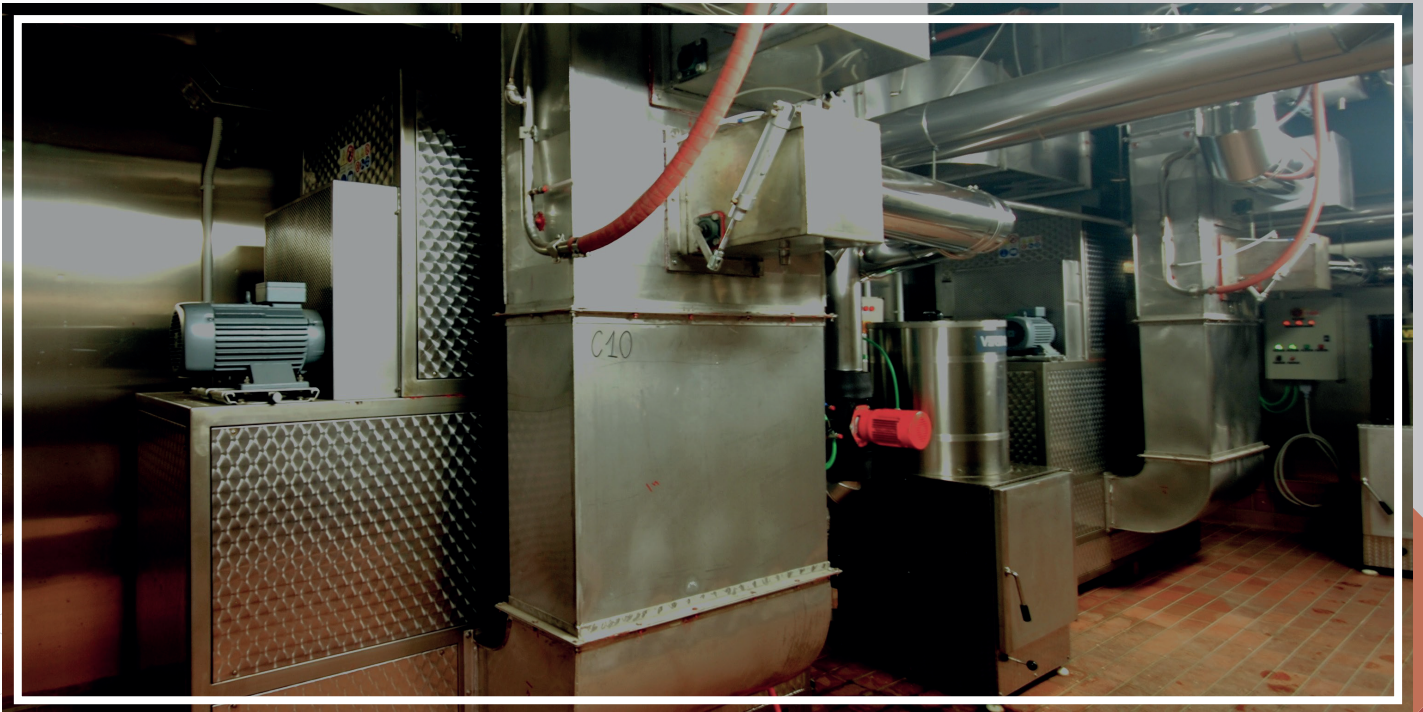
Madefrigor also uses high-tech solutions for speck. We offer systems for:

SPICINESS AND MOULDING: the speck whiskers are sprinkled with salt and a mixture of aromas (salt, pepper, juniper, rosemary, laurel). They are dry salted in a controlled environment for three weeks and turned several times to facilitate the uniform penetration of the brine

SMOKE DRYING: the whiskers are alternately subjected to the stages of smoking and drying. Smoking with low-resinous wood is light and the smoke temperature must be below 20°C. At our workshops, we make special units with batteries that are particularly treated against corrosion that smoke could cause. The washing systems guarantee the cleaning of the residues after each smoking cycle. Our machines are dimensioned and built for the individual needs of the customer.

SEASONING: The final stage. Here, the whiskers hangs in rooms filled with fresh air. The duration of the maturation is defined taking into account the final weight of the whisker and is about 22 weeks. During this phase a natural layer of aromatic mould is formed, removed at the end of the process, which rounds the taste of the speck and prevents it from drying out too much.





MORTADELLA'S PRODUCTION AND COOKING PLANTS

Mortadella, also called Bologna, is prepared in special air-conditioned rooms.

After this phase, it is cooked in **dry air stoves**, at a temperature of not less than 70°C for a time that varies according to the diameter of the product.

Finally, there is the **cooling phase** with water showers. This allows to lower the temperature which, internally, drops by 10° C.



COOKING PLANTS

Mortadella cooking plants must be installed in prefabricated or masonry rooms. They are sized for the **maximum amount of product** that can be stowed.

They are composed of: centrifugal aerothermal group with speed variation device; insulated ducts for air circulation outside the room; supply and intake ducts complete with diffusers and regulators inside; motorized dampers for air regulation, controlled by the computer according to the product temperatures.

We install **mortadella cooking stoves** that combine the hygienic-food requirements with the demanding technical-economic requirements of the producers of sausages.





MADEFRIGOR'S PLC

The control of the mortadella cooking system is entrusted to a PLC where all the working phases can be stored (Recipes).

Our PLC, Based on product temperature values (4 stove angles), coordinates all maneuvers according to programs memorized before by the operator and suitable for the type of product to be cooked.

On the screen will appear a graphic that includes: ambient temperature, product temperature (the average of the 4 readings), ambient humidity and the time.



MADEFRIGOR AROUND THE WORLD




madefrigor



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