



**ZANIN**

since 1956



## CEREAL COOLER WITH WHEELS



agro-industry



# CEREAL COOLER WITH WHEELS

## UTILIZATION

The refrigerator for cereals is a cooling system that treat the outside air with temperature and moisture levels and flows into the silos and warehouses dehumidified air and a lower temperature according to parameters established and governed by the need for optimal storage.

The control system is effected in a completely automatic way because regulated by a computer (PLC and touch screen) that, receiving the data relating to temperature and humidity of the outside air and the product, processes the cooling program producing large air masses with characteristics such as to achieve rapid cooling of the corn.

## TREATABLE PRODUCTS

The process of conservation through refrigeration may affect the following products: Wheat, Oats, Barley, Maize, Soya, Sunflower, Canola, Rice and any type of grain.

## THE PROCESS

Refrigeration of cereal through cooled air injection and dehumidified, allows a very rapid drop in temperature, blocking in this way the proliferation of mod, toxins, micotoxins, aflatoxins, bacterial flora, development of insects, considerably reducing the metabolism of the cereal itself.

The beans, being a live product, breathe, produce carbon dioxide, consume water, oxygen, produce heat and lose weight.

The cereal is stored at a temperature of +10 °C / +12 °C and produces a quantity of heat, carbon dioxide, water loss, 4 times lower than a corn stored at +20 °C, 15 times lower than a corn stored at +30 °C, 50 times lower than a corn stored at +40 °C.

It is clear that it's very important to lower the temperature of the cereals least below +18 °C / 20 °C even to lower the metabolism and then reduce significantly the weight loss.



## ADVANTAGES

Studies of the production have shown that a refrigerated product quickly compared to a product left to suffer with high temperatures, has a lower weight loss of at least 1% by mass. All this will be translate into more kg of cereals we will find in the silos at the time of sale. It is clear the economic recovery that results. Not less important is the consideration that a well chilled cereal requires no chemical treatments, mechanical movements, blocks the proliferation of potential toxins already present at the time of collection for the countryside. The cold does not improve the quality of what the land produces, but it certainly keeps.

From the point of view of costs, it should be noted that because the cereal generally is a bad conductor of heat, when the product is refrigerated, also when kept in metal silos, maintain the temperature for 7/8 months.

The refrigeration, ultimately, is the most natural, economical, practical, logical method for storing cereals.

## CONSTRUCTION

Bearing structure in steel and aluminium mounted on a towed carriage, equipped in the front with four fan motors for cooling the condenser coil, while on the rear part are positioned aspiration filters.

### GENERAL FEATURES

Their logic operation, consists of calculating the cooling of cereals in a gradual and progressive. Air at a temperature not too low and predetermined in manual mode, but air that, in relation to the actual temperature of the product, in a completely automatic way, it becomes progressively more cold hand in hand that drops the temperature of the mass to be cooled. The SIEMENS computer that operates the plant, constantly monitors the humidity and the temperature of the outside air and process characteristics such as temperature and humidity range, must have cooled and dehumidified air to be blown into silos

### FREE COOLING FUNCTION

The computer automatically decides if is possible to make the cooling with the compressor off, with obvious advantages from the point of view of energy. Compare the characteristics of temperature and humidity of the outside air with the temperature of the product and off or turns on the compressor according to the situations.

### ENERGY SAVING FUNCTION

Allows to evaluate in a completely automatic way, if the external climatic conditions, in relation to the product to be cooled, allows an "ECONOMIC" cooling. The system continually compares the external temperature to that of the product and then currency, but in any case after having already reached a situation of safety temperature in the mass, when the machine can operate with low power consumption or can be put in stand-by mode.

### MANUAL OPERATION OF TREATMENT FAN

Enables you to use the machine as a normal fan, but putting limits as on / off:

- Minimum temperature difference between air and product
- Minimum outside temperature
- Maximum outside temperature
- Maximum humidity outside air

### DEFROST FUNCTION

In a completely automatic way, if the evaporator coil would form ice, the computer will select the reverse cycle, injecting hot gas into the evaporator causing a rapid melting of the frost that might be formed.

### HISTORICIZING FUNCTION DATA

It allows you to store from 24 hours up to 20 days of operation the following information:

- Ambient temperature
- Outdoor air humidity
- Temperature of air blown into silos
- Product temperature
- Evaporating temperature

- High pressure compressor, low pressure compressor
- Numbers defrosts performed

### REMOTE ASSISTANCE FUNCTION (optional)

Using a GSM modem for data transmission plugged in electrical panel, allows to check the operation of cooler, unlock any blocks, reset operating parameters.

### MAIN COMPONENTS FOR SINGLE UNIT

- Supporting frame made of galvanized steel, painted steel casing with epoxy, aluminium profiles
- Liquid separator equipped with a safety valve
- Inspect filter with replaceable cartridges on liquid refrigerant supply Circuit
- Liquid optical indicator
- Manual shut-off valves for the main components of the circuit
- BITZER Compressor
- Computer SIEMENS
- Control Panel TOUCH SCREEN SIEMENS

### AIR TREATMENT SECTION

- N° 1 / 2 centrifugal fans with backward and high pressure blades, single inlet, mounted on a frame cage
- N° 1 / 2 electric motors B3 type of 15 kW , 2-pin, keyed directly on the fan
- Evaporator coil made with copper pipes and aluminium fins
- Refrigerant Distributor
- Injection electronic expansion valve
- Filtering section, classification EN 779 G4 Am 95%, operating limits 80 ° C RH 90% consists of corrugated regenerable filter cells made of synthetic fibre mounted on a steel frame with electro-settled galvanized steel net, micro net made of plastic with electrostatic effect
- Drip tray, stainless steel AISI 304
- Flow Rate Control System air treatment through damper driven by servomotor controlled electronically

### CONDENSING SECTION

Motor compressor Bitzer complete with:

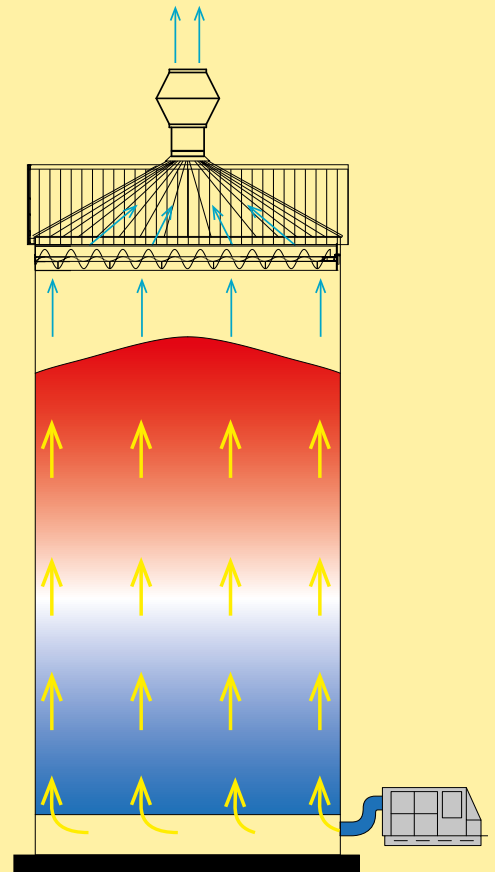
- Shut-off valve on the intake
- Check valve differential pressure integrated
- Electric motor with the PTC sensor for the temperature control
- Form for the control of: phase failure, phase sequence, thermistors engines, compressed gas temperature and delay starting of the compressors.
- Terminal with protection IP54
- Starting devices to empty and partializations
- Condensing battery built with copper pipes and aluminium fins
- Nr. 2 / 4 fans Ø 630, with external rotor motors, 4-pole, complete with mouthpieces and protective screens
- Connection anti-vibrating compression circuit refrigerant in stainless Steel AISI 304
- Hot gas defrost systems in heat pump

MODEL		RM 15-25	RM 18,5-40	RM 30-40	RM 30-50	RM 36-80
Downstream pressure fan 150 mm H2O	m <sup>3</sup> /h	19000	25000	38000	38000	50000
Downstream pressure fan 330 mm H2O	m <sup>3</sup> /h	8500	12000	17000	17000	24000
Cooling capacities expressed to the following conditions: Temp. + 30 ° C condensation / evaporation 0 ° C	kW	73,7	127,0	124,0	149,4	198,5
BITZER Compressor		4H-25.2Y	6G-40,2Y	HSK5363-40	HSK6451-50	CSH8553-80Yb
Rated power compressor	HP	25	40	40	50	80
Power fan treatment	kW	15	18,5	30	30	37
Power condenser fans	kW	2 x 2,5	4 x 2,5	4 x 2,5	5 x 2,5	5 x 2,5
Total rated power	kW	45	68,5	80	92,5	129,5
Electrical panel connection	V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Auxiliaries	V	220/1/50	220/1/50	220/1/50	220/1/50	220/1/50
Exterior Width	mm	2040	2240	2240	2240	2240
Exterior length	mm	4640	5195	5205	5205	5490
Exterior height	mm	2280	2555	2555	2725	2725
Weight	kg	2500	2800	3200	3300	3500
Flexible hose diameter	mm	400	600	600	600	2 x 600

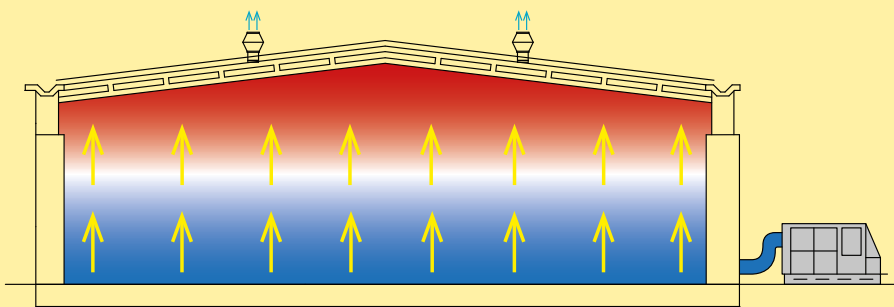
## OPERATION

The probes inserted into the product inside the silos or warehouses, transmit to the computer of the cooler the temperatures of the product to be cooled and also the outdoor air humidity in addition to the temperature of the gases return to the compressor, humidity and temperature of the refrigerated air, air taken into the sheds and silos pressures aspiration and compression.

All this data that appears on the computer in real time and is stored and elaborated, establishing in every detail the mode of operation for the plant. The control system is able to evaluate at each moment the most convenient way to meet the specific need of cooling. This refrigeration system optimizes the power consumption according to the initial temperature of the product to be preserved, the end temperature of the cooling and the external climatic conditions.



## COOLING SCHEME



## DETAILS

- 01) Silos installation
- 02) Warehouse installation

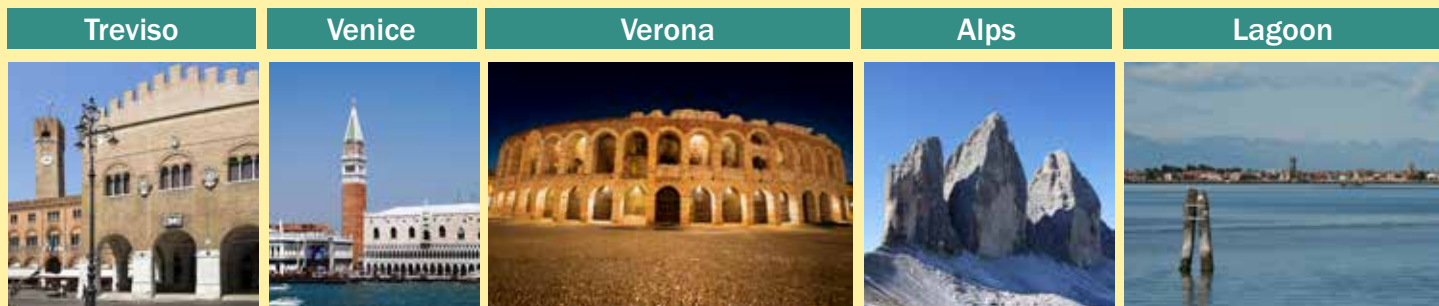
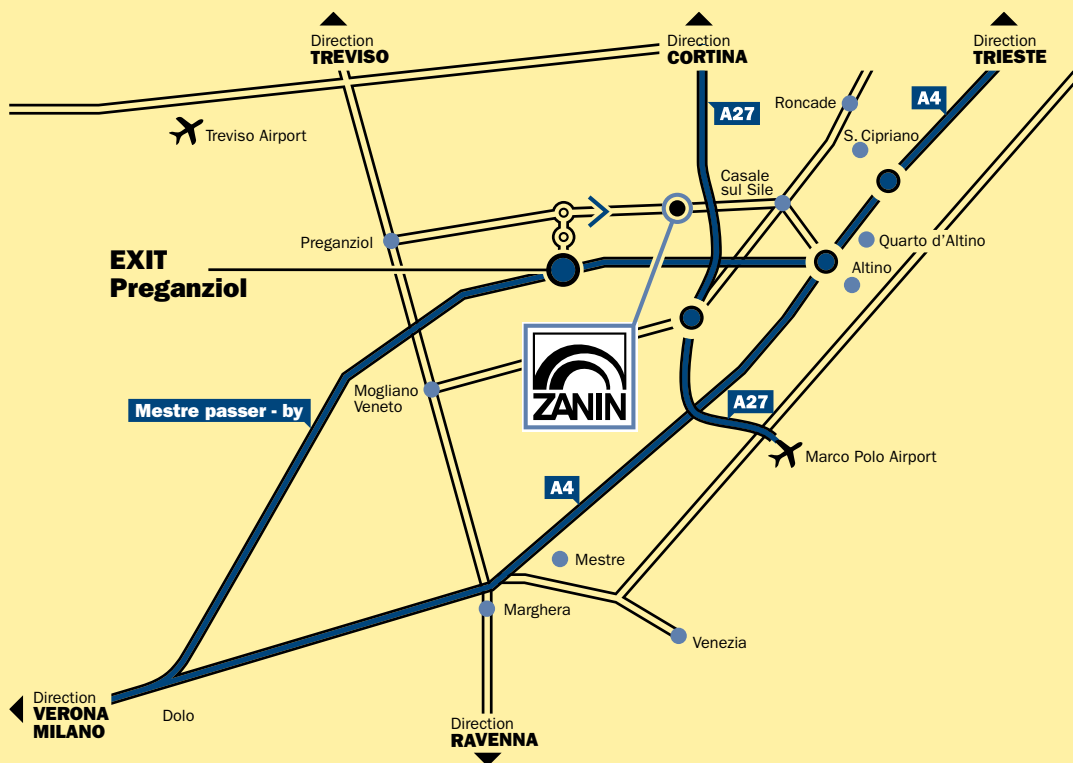




## DETAILS

03) Control panel with touch interface  
04) Fan detail

05) Transport chiller  
06) Installation on silos  
07) Incoming air filter detail  
08) Duct refrigeration detail



Photos by Glauco Granatelli, Walter Coledan, Dicaprio Veronica, Didier Descouens, Maik-T. Šebenik



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**RESELLER**

