Grain cooling: the definitive solution to grain storing

Grain and seed storing is a complex task. Associated typical difficulties to grain storing process are: weight and quality losses because of metabolic respiration of product -the larger of them the higher temperature and moisture-, insects, fungi, mycotoxins, etc. Mentioned troubles have been for many years considered as unavoidable, and they had been facing but only partially solving by means of over drying of product for safety reasons, turning of the grains, chemical fumigation against insects, and some other practices.







The CONSERFRIO® system, which is based on the refrigeration of the grain in hygrometric equilibrium with it, minimize the mentioned problems and stands for the cleanest, safest and most natural and ecologic method for conserving grains, seeds and most kinds of perishable granulated products.

Why to use this system? The grain, even after harvested, still keeps on breathing. This breathing is a combustion chemical process where the grain converts its own mass into carbon dioxide and water, which in turn heats up and re-wets the grain, accelerating the product self-destruction. This non-reversible process of respiration increases at higher temperatures and moistures of the grain. By the proper use of refrigeration, the mentioned grain damaging process is minimized and kept under control. The grain once chilled, keeps its low temperature for a long time, without the need for a continuous cooling. Direct consequences of non-controlled storing of wet grain are the appearing of fungi and toxins, which are a very dangerous for the health of humans and animals. The proper storing of grain by means of chilled and dry air fix completely or widely minimize the problem.

At ambient temperatures of 15º C and higher, the insects develop, infesting and devastating the stored product. As well as the weight loss also, the insect activity increases with temperature rise, up to a maximum level around 35º C, depending on varieties. Under 15º C, the insects do not develop so it is not necessary to perform any dangerous, expensive, poisonous chemical treatment.

In the case of seed storing, the preservation of their germinating potential is the most important goal. An adequate preservation of seeds, at low temperature and moisture levels results indispensable. Oilseeds and grains with high fat

content, particularly benefit from adequate preservation by means of refrigeration. On the contrary, the heat rots the oils, thus damaging the product in a non-reversible way.

Less fissured or cracked grains, better quality grain, ..., and many other benefits have been demonstrated along many years of experience in the grain refrigeration technique by means of the CONSERFRIO® units.






Where to use the system? The system can be used in most kinds of silos, cells and warehouses where grain is stored in bulk. In case of silos, the existing aeration inlet is used for the chilled air injection, so no additional civil works on the silo are normally necessary. In case of warehouses, the air is distributed by means of a necessary a duct system, which can be installed under or over the floor. The dimensions and distribution of the ducts is critical. Our technical department will give you all the necessary support in order to reach the most cost-efficient refrigeration also in warehouses.

Products that apply All kind of grains, seeds, oilseeds and perishable granulated products as wheat, corn, oats, barley, maize, rice (paddy, cargo, milled), soybeans, rapeseed, sunflower seed, cotton seed, ..., feed pellets, fish-meal pellets, ...



Costs The operating costs depend on the climatic zone where the chiller is used. Typical costs of Conserfrio® use vary from 2,5 to 5 kWh per metric ton of grain, corresponding the lower value to temperate weather and the higher to tropical environments, with very high temperatures and/or humidity. The savings due to the use of the Conserfrio® units can be resumed as no need of product over-drying, no energy costs of conventional aeration, no energy for grain turnings, outstanding cut of weight and quality losses, no costs of chemical treatments against insects. Because of mentioned, payback is typically reached between 1 to 2 years of use.

The Conserfrio® units are special, compact, mobile grain chillers, delivered completely assembled and tested, ready for start-up, requiring only electric energy for operation. The units work automatically according to the settings of the operator, not needing special surveillance. Each unit has all necessary safety switches and conforms to all regulations that apply. The Conserfrio® units use the latest technology available, thus getting the highest cost-efficiency possible.

Our production range covers all the needs, with capacities starting from 40 up to more than 600 tons of grain per unit, daily. Hundreds of units installed in many countries are our references.

CONSERGRA

REFRIGERACIÓN DE GRANOS
GRAIN COOLING

Thailand & South East Asia Official Partner

CGRAIN TECHNOLOGY CO., LTD.

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El método más económico y ecológico
para la conservación de cereales

The most cost effective and ecological
system for conserving grains

Air Conditioner for Silos Model F200 TD

CONSERFRIO® grain chilling units for the safest and cost-effective storage of bulk grain, seeds and perishable granular products as wheat, barley, paddy rice, milled rice, maize, soybeans, sunflower seeds, cotton seeds, alfalfa pellets and cubes, feed pellets, etc.

- The units are fully designed, manufactured and tested in our ISO 9001:2015 certified company.
- CE certification.
- Fully automatic operation: automatic air temperature and air relative humidity control.
- Touch panel HMI, PLC, digital control, motors driven by reliable inverters, assuring high energy savings, silent and smooth operation, highest accuracy output of chilled air conditions.
- The units are weather protected by means of metal casing with lockable doors.
- Long experience, we produce grain chillers since 1969.





Technical data CONSERFRIO® Air Conditioner for Silos Model F200TD

Grain refrigerating capacity Maximum capacity Minimum capacity Average capacity		320 ton/day 150 ton/day 200 ton/day	
Chilled airflow characteristic curve	1,000 Pa 2,000 Pa 3,000 Pa 4.000 Pa	11,200 m³/h 10,000 m³/h 8,100 m³/h 5600 m³/h	
Nominal refrigerating capacity of the compressor 0ºC/+30 ºC at evaporating /condensing temperatures 0ºC/+40 ºC 0ºC/+50 ºC		**50 Hz** 73.8 kW 64.9 kW 55.6 kW	**60 Hz** 88.6 kW 77.9 kW 66.7 kW
Power input Electric power input of compressor at nominal conditions Chiller input load at nominal conditions to=0 ºC y tc=40 ºC Maximum input load Electric plug CEE (the unit includes its own 90 A plug)		16.1 KW 30.1 kW 41.9 kW 125 A	19.3 kW 36.1 kW 50.3 kW 125 A
Chilled air connection Ø		400 mm	
Main sizes	length width height weight	3,825 mm 1,720 mm 2,877 mm 2.210 kg	

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The most cost effective and ecological
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Air Conditioner for Silos Model F300 TD

CONSERFRIO® grain chilling units for the safest and cost-effective storage of bulk grain, seeds and perishable granular products as wheat, barley, paddy rice, milled rice, maize, soybeans, sunflower seeds, cotton seeds, alfalfa pellets and cubes, feed pellets, etc.

- The units are fully designed, manufactured and tested in our ISO 9001:2015 certified company.
- CE certification.
- Fully automatic operation: automatic air temperature and air relative humidity control.
- Touch panel, PLC, digital control, motors driven by reliable inverters, assuring high energy savings, silent and smooth operation, highest accuracy output of chilled air conditions.
- The units are weather protected by means of metal casing with lockable doors.
- Long experience, we produce grain chillers since 1969.





Technical data CONSERFRIO® Air Conditioner for Silos Model F300TD

Refrigerating Cooling capacity for grain Maximum capacity Minimum capacity Average capacity		500 ton/day 260 ton/day 300 ton/day	
Cold airflow characteristic curve	1,000 Pa 2,000 Pa 3,000 Pa 4,000 Pa 5,000 Pa	19,000 m³/h 18,000 m³/h 16,000 m³/h 13,000 m³/h 8,000 m³/h	
Nominal refrigerating capacity of the compressor 0ºC/+30 ºC at evaporating /condensing temperatures 0ºC/+40 ºC 0ºC/+50 ºC		**50 Hz** 113.0 kW 99.1 kW 84.6 kW	**60 Hz** 133.5 kW 117.0 kW 99.8 kW
Power input Electric power input of compressor at nominal conditions Chiller input load at nominal conditions to=0 ºC y tc=40 ºC Maximum input load Electric plug CEE (the unit includes its own 150A plug)		 25.3 kW 48.0 kW 63.0 kW 125 A	 29.8 kW 56.6 kW 74.4 kW 125 A
Cold air connection Ø		500 mm	
Main sizes	length width height weight	4,050 mm 1,920 mm 3,025 mm 2,660 kg	

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Air Conditioner for Silo Model F450TD

CONSERFRIO® grain chilling units for the safest and cost-effective storage of bulk grain, seeds and perishable granular products as wheat, barley, paddy rice, milled rice, maize, soybeans, sunflower seeds, cotton seeds, alfalfa pellets and cubes, feed pellets, etc.

- The units are fully designed, manufactured and tested in our ISO 9001:2015 certified company.
- CE certification.
- Fully automatic operation: automatic air temperature and air relative humidity control.
- Touch panel, PLC, digital control, motors driven by reliable inverters, assuring high energy savings, silent and smooth operation, highest accuracy output of chilled air conditions.
- The units are weather protected by means of metal casing with lockable doors.
- Long experience, we produce grain chillers since 1969.





Technical data CONSERFRIO® Air Conditioner for Silos Model F450TD

Grain refrigerating capacity Maximum capacity Minimum capacity Average capacity		650 ton/day 375 ton/day 450 ton/day	
Chilled airflow characteristic curve	1,000 Pa 2,000 Pa 3,000 Pa 4.000 Pa 5.000 Pa	24,500 m³/h 22,000 m³/h 19,000 m³/h 15,000 m³/h 8,000 m³/h	
Nominal refrigerating capacity of the compressor 0ºC/+30 ºC at evaporating /condensing temperatures 0ºC/+40 ºC 0ºC/+50 ºC		**50 Hz** 166.5 kW 143.0 kW 121.0 kW	**60 Hz** 196.5 kW 168.5 kW 142.5 kW
Power input Electric power input of compressor at nominal conditions Chiller input load at nominal conditions to=0ºC y tc=40 ºC Maximum input load Electric plug CEE (the unit includes its own 250A plug)		37.2 kW 63.0 kW 91.9 kW 200 A	44.6 kW 76.0 kW 118.3 kW 200 A
Chilled air connection Ø		700 mm	
Main sizes	length width height weight	4,855 mm 2,340 mm 3,617 mm 3,870 kg	

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