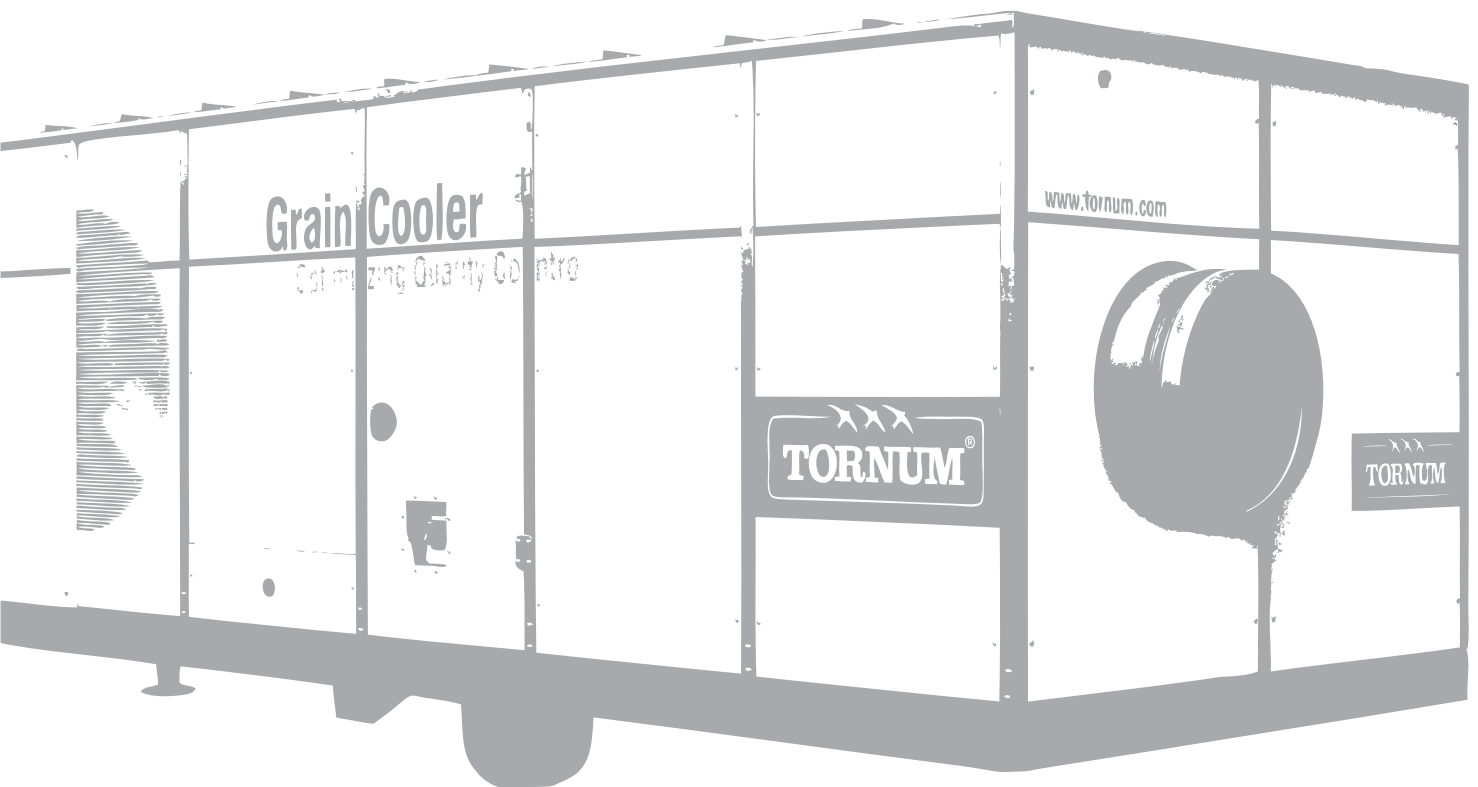


Grain Cooler

Optimizing Quality Control





TORNUM Grain Cooler

environmental-friendly, economical and practical

Grain is our food! Using a TORNUM Grain Cooler we can help you treat it that way. Grain is also a living material and has to be treated accordingly. A TORNUM Grain Cooler accomplishes what nature cannot always provide - safe storage temperature regardless of ambient conditions.

Controlling the temperature in the grain storage is the natural way of preserving the grain and optimizing grain quality. In our truly environmental-friendly refrigerant system we are using 80 % less refrigerant compared to traditional refrigerant systems.

Among the many advantages of using a TORNUM Grain Cooler are:

- Eliminating the need for chemicals for insect control.
- Drying effect while cooling grain having 15 % or more moisture content; for every 10°C(18°F) temperature reduction 0,5-0,75 % drying effect.
- Always safe storage conditions.
- Low operation cost.



Heat – grain’s mortal enemy

Grain is our food! Grain is also a living organism, when it breaths it loses both weight and value. Molds, fungi and insects can develop fast in case the grain is not stored under the correct conditions.

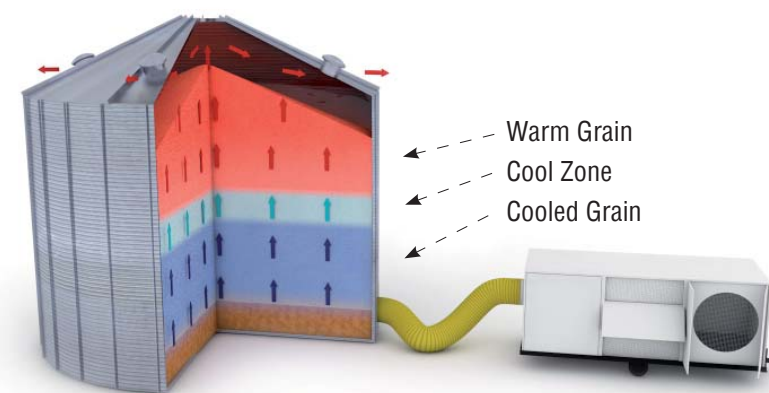
A TORNUM Grain Cooler is controlling both temperature and the relative humidity of the cooled air – regardless of ambient conditions – no need for using highly toxic chemicals to protect grain in storage from being damaged by insects.

80 % less refrigerant

The refrigerant system used in TORNUM Grain Coolers is a state of the art indirect cooling system using 80 % less refrigerant compared to traditional systems. We have achieved this by cooling water which is pumped to a cooling coil where air when passing through is reduced in temperature.

As grain is hygroscopic also the relative humidity of the cooled air must be controlled prior to entering into the grain mass. After the cooling coil the air is passing through a re-heating coil in order to make sure the relative humidity of the cooled air is in balance with the moisture content of the grain being chilled. No extra energy is required for re-heating the air – only excess heat from the refrigerant system is used in the re-heating process.

The whole cooling process is fully automatic and controlled through a PLC system programmed to handle 11 different types of grain including manual operation.



Cooling in a silo

The cooled air is distributed in the silo/flat storage through a duct system in the bottom of the silo/flat storage. As the cooled/conditioned air is moving up through the grain mass the temperature in the grain is reduced to the set value. Grain is an excellent insulator, once chilled to a low temperature it will remain cool for a substantial time period.



Cooling compressor with automatic capacity regulation and heat exchanger. Type of refrigerant, 14-16 kg R407C depending on the size of the cooler.

Complete electrical cabinet with user friendly Mitsubishi PLC system programmed to handle 11 different types of grain including manual operation.



Air intake for the two condensing coils.

Adjustable draw bar with parking support.

Intake filter with foldable rain hood.

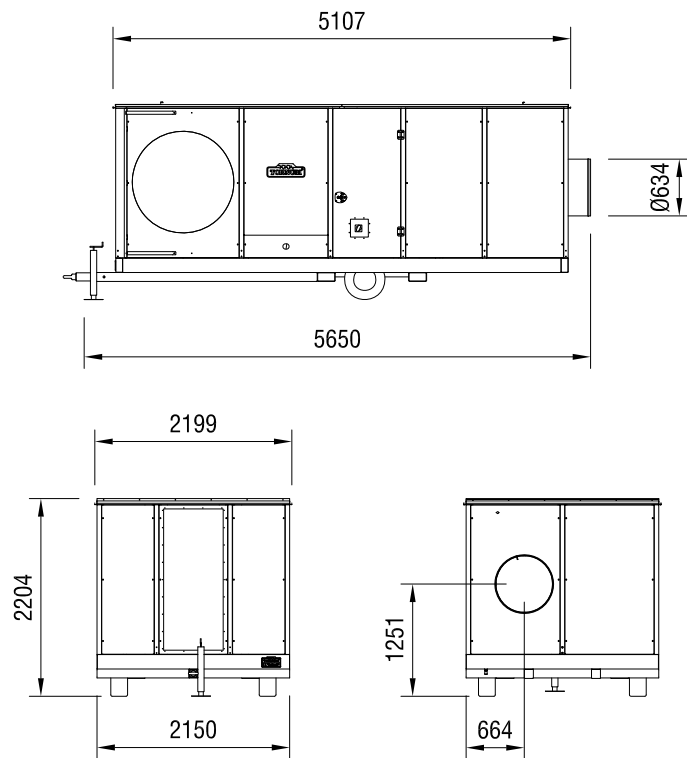


Well protected condensing fans.



Airoutlet Ø 630 mm. Extra electrical re-heating coil is standard.





Size and construction

TORNUM Grain Coolers are fully computerized and ready for immediate use once connected to the main power supply. Our coolers are mobile and are as standard delivered with a 5 meter flexible hose for connection between the cooler and the silo/flat storage and external temperature sensor.

As optional the coolers can be delivered with the possibility to be operated through a central computer system. Depending on the temperature cables used it is possible to integrate the cooler with the temperature cables having automatic start/stop of the cooler according to set temperature levels.

The Grain Cooler is designed to be shipped in a 20 ft standard container.

Capacity and Dimensions

TORNUM Grain Coolers are available with different capacities. The Coolers are designed with a truly environmental-friendly indirect cooling system requiring 80 % less refrigerant compared to traditional cooling systems.

MODEL	80	100	120
Cooling capacity Cooling capacity is depending on several conditions. Capacities stated are valid for tropical respectively favorable ambient conditions and are to be considered as a guideline only. For capacity figures based on actual conditions please contact TORNUM or our representative.	120,000-550,000 kg/day	150,000-550,000 kg/day	169,000-550,000 kg/day
	(4,800-22,300 bushels/day)	(6,100-22,300 bushels/day)	(6,850-22,300 bushels/day)
Fan capacity at a static air resistance of:	50 Hz	50 Hz and 60 Hz	50 Hz and 60 Hz
100 mm WG 3.94 inches WG	17,500 m³/h 10,300 cfm	20,000 m³/h 11,770 cfm	20,000 m³/h 11,770 cfm
200 mm WG 7.87 inches WG	16,250 m³/h 9,560 cfm	19,500 m³/h 14,480 cfm	19,500 m³/h 14,480 cfm
300 mm WG 11.81 inches WG	15,000 m³/h 8,830 cfm	18,200 m³/h 10,710 cfm	18,200 m³/h 10,710 cfm
Nominal compressor cooling capacity at: +30°C/86°F condensing temp 0°C/32°F evaporating temp	50 Hz 86 kW, 293,400 btu/hr	50 Hz 104 kW, 354,900 btu/hr 60Hz 102 kW, 348,000 btu/hr	50 Hz 126 kW, 430,000 btu/hr 60Hz 122 kW, 416,300 btu/hr
Motor data Nominal input effect Maximal input effekt	50 Hz 56 kW 60 kW	50 Hz and 60 Hz 61 kW 74 kW	50 Hz and 60 Hz 67 kW 81 kW
Minimum main fuse 400 V	50 Hz 125 A	50 Hz 145 A	50 Hz 160 A
Weight [kg / lbs]	4200 / 9260	4600 / 10140	4900 / 10800
Maximum transportation speed	5 km/h, 3,1 mph		



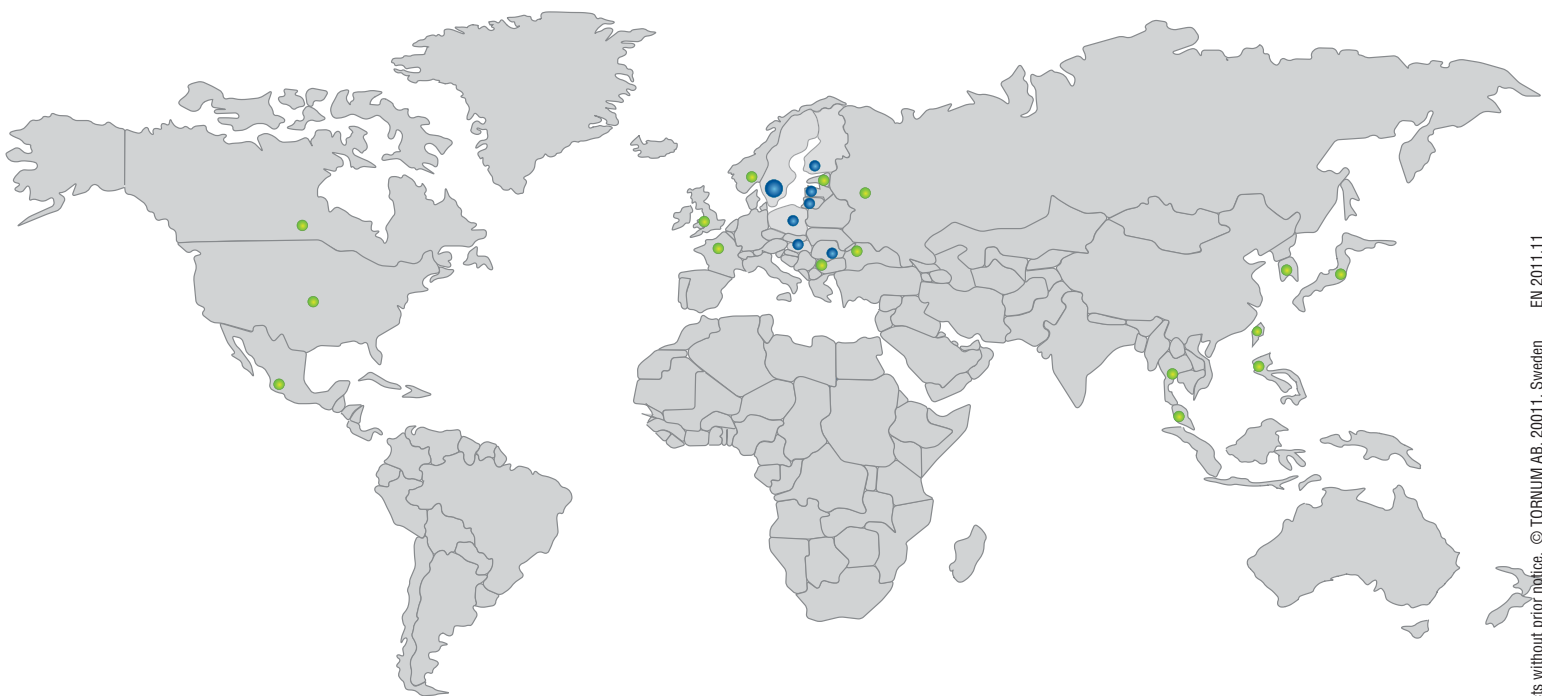
Optimizing Airflow KANALSYSTEM™

The KANALSYSTEM™ was designed to provide the quality airflow to properly condition grain using the total climate control provided by the TORNUM Grain Cooler. It has accomplishes this goal in all types of silos up to 170 ft (52m) height and is equally at home in flat storage buildings.



TORNUM

– A Global Partner



TORNUM has many years of experience in manufacturing and supplying complete grain handling systems for the agricultural and grain industries. We offer complete solutions for drying, storage and conditioning of grain both for new plants and extensions to existing facilities.

Our manufacturing program includes an extensive range of products for grain handling including dryers, storage silos and coolers. TORNUM strives to deliver professional customer guidance to construct and build the best possible system for their operations.

We serve our customers through our head office in Sweden, subsidiaries in Poland, Hungary, Romania, Finland, Latvia and Lithuania or via representatives in other countries. TORNUM has become famous for its design and proven capacity. Before you start your next project – it is worth contacting TORNUM.

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