

# FARM & COMMERCIAL GRAIN DRYERS

• ENERGY EFFICIENT

• TOTALLY AUTOMATED

• PRESERVES THE QUALITY OF THE GRAIN

THE FUTURE IS HERE...

GRAIN DRYING PRINCIPLES

**A** Grain is introduced into the top of the dryer where a leveling auger spreads the grain across the garner bin of the dryer. An optional gravity fill system is also available.

**B** Belt driven forward curved centrifugal fan(s) quietly and efficiently deliver large quantities of air into the dryer.

**C** A highly efficient Maxon™ burner heats the air, which lowers its relative humidity, allowing it to carry away more moisture. Modulating controls regulate the gas flow, providing a uniform air temperature.

**D** An adjustable baffle allows you to divert some air around the burner to provide cooling within the dryer, if desired. You can adjust the amount of air dedicated to cooling the grain while maintaining as much air as possible dedicated to drying. This feature also allows you to convert quickly and easily to an oil heat dryer.

**E** An extra large transition efficiently introduces the air into the plenum.

**F** Inlet ducts are open inside the plenum to allow the heated air to enter. The bottoms of these ducts are open to allow this air to enter the grain. Because of the unique design of these ducts, although the grain surrounds them, it will not flow out. No performance robbing screens are necessary to hold the grain in and block with fines and trash.

**G** Outlet ducts are staggered at an efficient distance to allow for air movement through the grain. These ducts are similar to the inlet ducts except they are open on the bottom and the outside of the dryer to allow the moisture-laden air to leave the dryer.

**H** A moisture sensor is located within the grain column to monitor the moisture as the grain flows through the dryer.

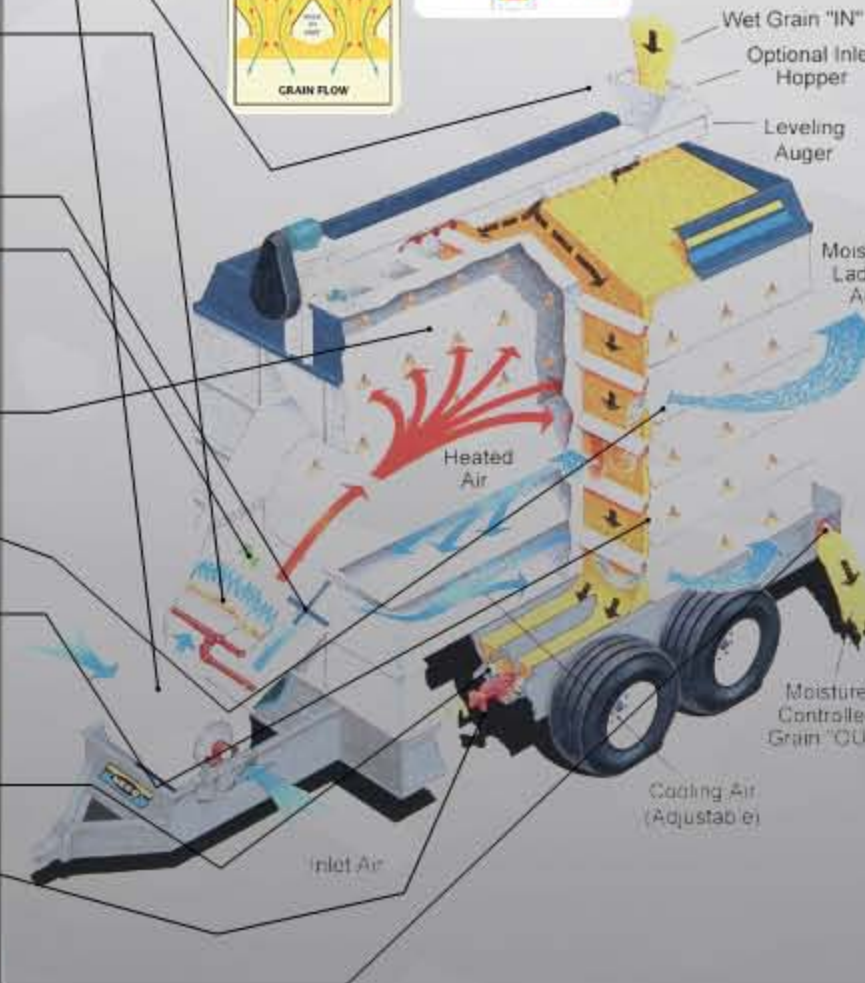
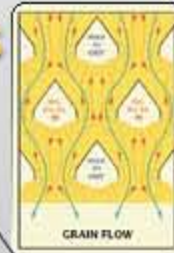
**I** A set of four, fluted metering rolls are turned by a 90 volt DC motor to meter the flow rate through the dryer. Speed of these rolls is automatically controlled by the moisture sensor, which changes the rate at which the grain is discharging from the dryer depending on the moisture reading it obtains from the grain as it flows through the dryer.

**J** Discharge augers run under the dryer collecting the grain coming out of the metering rolls and moving it to the rear of the dryer.

**K** A cross auger at the back of the dryer collects the grain from the two discharge augers and drops it out for transfer into storage. This auger can be provided to discharge out of either side or out the center of the dryer.

## HOW THE NECO SCREENLESS DUCT DRYER WORKS

Cure vs. Thrust



Wet Grain "IN"

Optional Inlet Hopper

Leveling Auger

Moisture Laden Air

Heated Air

Moisture Controlled Grain "OUT"

Cooling Air (Adjustable)

Inlet Air



The NECO multi-blade fan provides maximum air output with minimal energy consumption.

A belt drive allows us to customize the speed of the fan to match the performance required to dry grain efficiently and fast.

The forward, curved blades used in the NECO dryer literally scoop the air up and propel it through the grain with just the right velocity to provide maximum drying output.

The NECO fan is designed to produce high air flow at a low speed, reducing vibration. This allows a longer life expectancy from all components of the dryer and easier starting of motor on start up.



The NECO dryer has a large holding capacity. This feature allows the grain to spend more time in the dryer, allowing it to dry in a more natural manner.

Servicing is easier with hinged belt guards and quick release latches on the control box. Diagnostic lights pinpoint the reasons for safety shutdowns.

In the NECO dryer, all the grain moves in and out of the hottest air several times during its passage through the dryer. As a result of this unique NECO duct system, all kernels are dried evenly avoiding stress cracking, discoloration or chalking of grain. Test weight and quality of the grain are maintained.

A complete clean out of the dryer with the flip of a lever. Every kernel falls free to avoid contamination of grain.



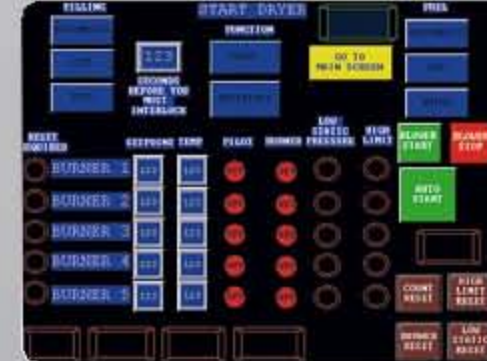
The unique shape of the ducts hold the grain in without dependence on the hole size, so no special screens are required when drying small seed crops.



The Maxon™ burners used in the NECO dryer are extremely efficient. The wide area they cover and short flame length combine to provide equal to heat distribution to all the air throughout the entire dryer. This means faster, more efficient drying with the lowest moisture differential possible throughout the entire dryer.



An electronic moisture sensor is located in the grain. This sensor measures the actual moisture content of the grain as it flows through the dryer. Depending on whether the grain is wetter or drier than desired, it either slows down or speeds up the rate at which grain is discharged from the dryer.



### Smart Processing Systems

"In the future, dryers will be designed, built and operated differently as well. Smart processing systems will automate many manual tasks and make it easier for operators to track performance of their dryers more closely. Temperatures, moisture contents, grain quality, and grain flow will be automatically controlled, and records including weather conditions and fuel consumption will be linked directly with the company database."

Dr. Dirk E. Maier, Ph.D., PE — Purdue University  
Dr. Fred W. Bakker-Arkema, Ph.D. — Michigan State University  
Grain Drying Systems — July, 2002, page 9

### NECO's Optional PLGC System

- Programmable
- Logic
- Graphic
- Control

The PLGC system is a simple, user friendly touch screen that is capable of controlling your entire grain handling system from one central screen. Our PLGC is capable of receiving commands, and sending Alerts through internet, cell phone, and landline. These options represent only a fraction of the capability the PLGC offers. This is just another example of innovation from the industry leader in Commercial Grain Drying, NECO.

### TO MINIMIZE STRESS WHILE DRYING YOU MUST TREAT EACH SEED EQUALLY & ALLOW THE PROPER RETENTION TIME

**Seed Temperature**  
When drying grain the maximum kernel temperature is the leading factor that affects final grain quality. Overheating the grain within a dryer will cause damage to the final product. Some studies show that kernel temperatures as low as 140° F (60° C) will affect the overall grain quality adversely. Many purchasers of grain, especially specialty crops, insist that their grain suppliers use lower drying temperatures to eliminate heat damage to the grain. This is because they realize with most dryers the grain is heated unevenly. Although some of the grain in a standard dryer never exceeds the critical kernel temperature, much of it goes way above, and that grain gets damaged. Lowering the drying temperature in an attempt to maintain grain quality, in a typical dryer adversely affects the efficiency and capacity of the dryer as well.

The NECO dryer eliminates this disparity in drying, treating all kernels evenly to the heated air, not letting any kernels spend too much time directly exposed to the heated air. This results in higher quality grain with less stress cracks, no heat damage, and higher test weight.

**Retention Time**  
Grain is normally dried by passing heated air through it. This air has the opportunity to flow around each kernel. Because the air is heated it starts out with a very low relative humidity, meaning it has the ability to absorb moisture. As the air flows through the grain it absorbs moisture from within the kernel. As the moisture evaporates it cools the kernels much like the cooling effect when moisture is evaporated off your skin in the summer. Because of this evaporative cooling effect, the wetter kernels never approach the temperature of the heated air. As the grain gets drier less evaporation occurs around the kernels and so the grain temperature moves closer to the air temperature. With a typical cross flow dryer (screen dryer), the same grain is next to the heat all the way through the dryer so it gets over dried (thus over heated) while the grain on the other side of the grain column never gets exposed to the hottest air so it is under dried. This can have a devastating effect on grain quality, efficiency, and capacity of the dryer.

**Mixed-Flow Dryers**  
With a NECO dryer the grain is constantly moving past a series of unique hot air ducts. This grain is constantly moving in and out of the hottest air, so all the grain gets a chance to be exposed equally to the hottest air. Furthermore the gentle mixing and loosening of the grain as it flows around these ducts insures that the grain is dried evenly and that airflow through the grain is increased, enhancing the efficiency and capacity. None of the grain in a NECO dryer is over dried or under dried. Kernel temperatures in a NECO dryer remain low for all the grain, meaning higher grain quality, better efficiency, no heat-damaged grain, lower stress cracks, and higher test weights. Simply put the NECO grain dryer offers a better way to dry grain!