

T

Temperature Monitoring System





Our Experience – Your Guarantee

Grain and seed handling requires the utmost care and efficiency at the same time. Cimbria Unigrain has built a profound and market leading specialist know-how within development, production and supply of plants on turnkey basis including installation and training.

Together with our thorough knowledge of crop handling and processing, this contributes to a successful project implementation of projects related to grain and seed.

Global references

From our global activities in more than 50 years, we possess valuable know-how and experience in local conditions for grain, seed and feed handling from almost all regions of the world. In our design of all kinds of grain, seed and feed handling facilities we draw on our know-how and experience to optimize the facility in all aspects for the benefit of the individual client.

Firm project management is one of the keywords to secure coordination of production, delivery and erection. Cimbria's firm management control of all processes ensures that projects are commissioned in time; exactly as stipulated in the contract and design specifications.

Project Control

A firm project control contributes to an anchoring of the security and quality that lies in our projects. At Cimbria one responsible senior project manager has the control once the order has been placed until the guarantee period expires.



Nairobi silo, Kenya



*Complete turnkey project,
Saudi Arabia*



Complete turnkey project, Egypt



Grain Care – What we believe in

Cimbria has a long-standing experience in the grain business and has supplied more than 6,000 temperature monitoring systems. This guarantees that our clients receive the right counselling, the right application as well as the right quality ensuring the most efficient and secure storage of grain.

Why temperature measurement?

Grain can be stored in many ways i.e. in silos or in flat stores. It is a common belief that the only threat to the stored grain are insects, impurities and rodents. This is only partly the truth, because the real threat to stored grain are factors like moisture content, ambient temperature, ambient humidity, storage time and the grain temperature.

If these parameters are not in balance, a reduction of the grain quality could occur and may result in severe damage to the grain.

An essential factor for the grain quality is the balance between water content and temperature. If one of these factors is too high the grain might start to „sweat”. During the „sweating” process, the grain will emit dry matter and water (loss of weight). In case the process is not stopped, the conditions in the silo or flat store will provide optimum conditions for micro organisms, insects and other impurities. This could result in a self-perpetuating process destroying the grain even faster.

With Cimbria’s Temperature Monitoring System, the operator is able to act in time to prevent a possible negative development in the stored grain. Problems with the stored grain may be solved either by moving, drying or ventilating the grain.



Flat warehouse, DLG Stagstrup, Denmark



Silo Complex, Svenska Foder, Sweden



Silo Complex, BAF, port of Rønne, Denmark



R References...



Lesiolo, Kenya



Euro-silo, Belgium

**The Modelo Group's malting plant in Zacat
temperature monitoring system that Cimbr
complete system consists of 480 tempe**

The silo complex consists of 480 b



Egyptian Holding Co., Egypt



Vilkaviskis, Lithuania



all over the world



SL Helsingborg, Sweden



Garant, Austria

**ecacas, Mexico is the largest installation with
ia Unigrain has delivered in recent time. The
perature cables with almost 5000 sensors.**

ins and 14 germination chambers.



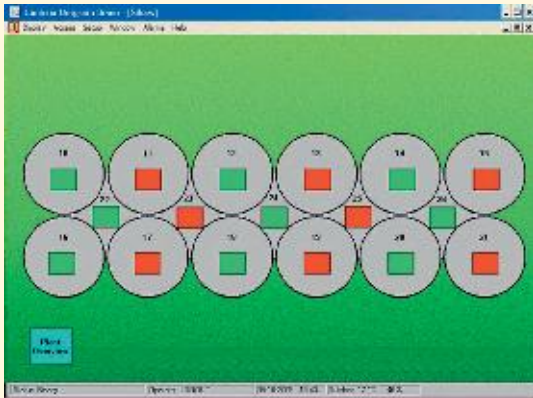
VKB, South Africa



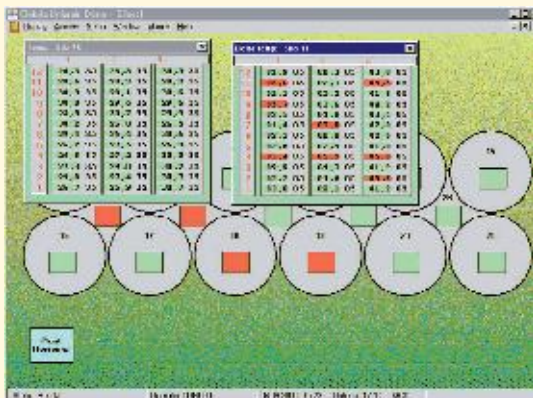
Eldoret, Kenya



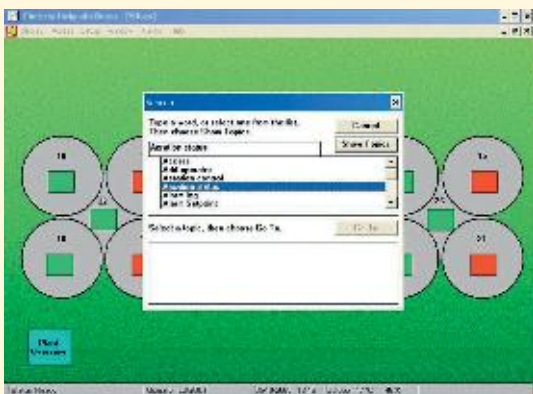
Software Facilities



Storage plant view with alarm status



Display of actual- and delta temperatures



On-line help for operator

The new generation of Unitest® provides operators with many new and improved facilities in order to optimize the drying process, the fumigation and aeration costs, so loss of dry-matter, weight and unnecessary handling can be avoided. The software's unique facilities combined with the markets most reliable hardware are our customers' best insurance for safe storage.

Standard Key facilities in Unitest® software

- **Storage plant view**
Indicates storage situation in each bin or warehouse
- **Actual temperature**
Display of present readings from all sensors
- **Delta temperature**
The temperature changes in all sensors within the last 24 hours
- **Alarms**
According to actual- and delta temperatures and grain level
- **Alarm set points**
On each individual cable based on actual and delta temperatures
- **Language**
Available in any language
- **Level Control (manual)**
Selective display of grain level for each bin
- **On-line help**
Instant help to operator - no manual is required
- **Standard Data base**
Saves information for up to 4 weeks



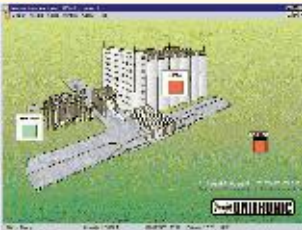


The **Unitest®** Product Line



Read out units

Any personal- or lap-top computer with MS-Windows.



Software

The unique customised software provides the operator with many facilities to optimize the storage of any grain.



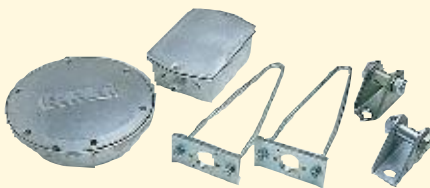
Interface

The interface is made with the most reliable components available on the market.



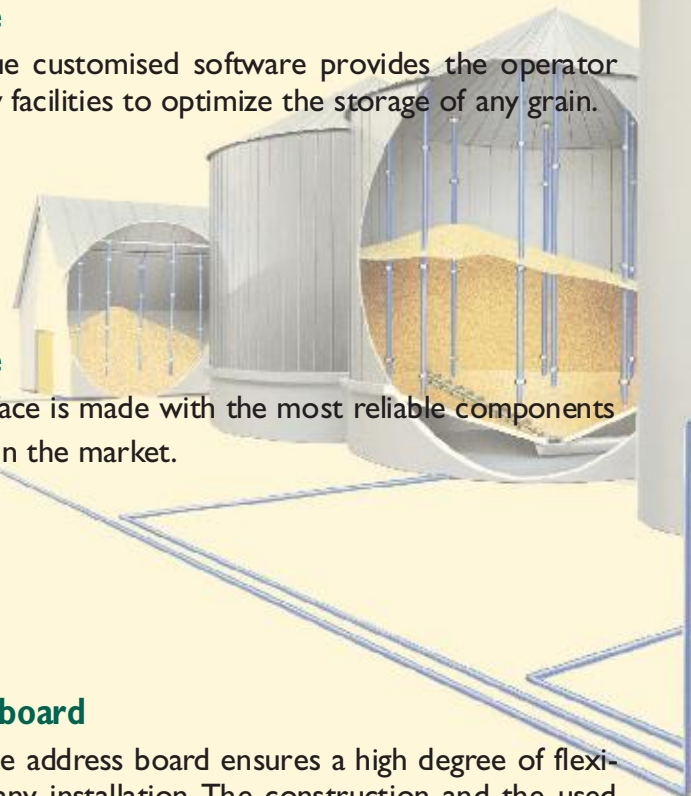
Address board

The unique address board ensures a high degree of flexibility for any installation. The construction and the used components make the monitoring system intrinsically safe.



Suspension

The range of suspension ensures the right solution for any storage facility.





Specifications for the Installation

Following factors must be considered when planning an installation:

1. Size and shape of the building (Construction drawings)
Height and diameter of the bins.
Number of bins.
2. Strength of the roof construction.
How to suspend the cables.
The necessity of a roof support.
3. Building material and construction. (E.g. concrete or steel)
4. Which commodities are to be stored and for how long time?
5. Climatic conditions.
6. Which temperature monitoring system is to be employed for the plant?
7. Distance between control room and silo/warehouse.
8. Required number of cables per bin.
9. Required number of sensors per cable.

Our recommendations

Cables

The number of cables suspended in a silo depends on the diameter of the silo, the stored commodity and the climatic conditions.

There is no mathematic formula to calculate the necessary number of cables per silo, but the table below shows our recommendation, based on our experience from more than 6,000 installations.

Sensors

The number of sensors in a cable is mainly depending on the length of the cable. By experience, we have learned that the maximum length between sensors is 5 meters. However, the best result is achieved if the distance between the sensors is kept around 3-4 meters or less.

The final decision on the number of cables and sensors in a silo is always made in close co-operation with the customer.

Silo diameter in meters	6	8	10	12	14	16	18	20	22	24	26	28	30	35	40
Total number of cables	1	3	3	4	6	7	8	11	12	16	17	19	22	29	34



Customized Solutions



In 2001, Møre & Romsdal Kornsilø in Norway decided to install the Cimbria Temperature Monitoring System. In addition to the standard features, Møre & Romsdal kornsilo had a request for level measurement in order to get an overview of the storage capacity in each silo and to avoid false alarms from the sensors placed outside the grain when running the silo at less than 100% capacity.



Møre & Romsdal Kornsilø, Norway

In order to make the system as accurate as possible, more sensors were implemented in each cable in order to minimize the distance between the sensors. The initial level measurement system worked on a manual basis whereas the second version of the software system has been fully automated and the level is updated every 15 min.

Today, Cimbria has installed the Temperature Monitoring System with level measurement in more than 1000 bins at a price which can compete with any other conventional level measurement system in the world.

The main advantages by using the level measurement in conjunction with the temperature monitoring system are:

- No false alarms (no measurement from empty bins)
- A reliable level measurement system (no wrong readings due to dust)
- Accuracy (depends on the no. of sensors)



Stavanger, Norway

Award

At the Victam Exhibition 2004, the new software with level measurement was nominated for the best invention in the category »Information Technology«.



