

## Advanced digital solutions to monitor and control stored grain conditions

The iGrain portfolio of products offers a complete solution for monitoring temperature, moisture and spoilage prevention, using advanced digital technology and automated controls to optimize the condition of stored grain in silos, flat storage warehouses, and grain piles. We are proud developers of this technology in our headquarter in Denmark and our products and systems are installed and performs in Europe, the Middle East, the Far East, Asia, Russia, North- and South America and Africa.



### Temperature monitoring

The iGrain temperature cables use advanced digital sensors encased in a durable sensor cable. This digital technology is proven to be highly accurate with a long service life, resulting in lower maintenance, higher reliability and lower total cost of ownership than other types of temperature cables. Data from the temperature cables can be sent to almost any kind of PC loaded with iGrain software. It is also possible to connect to PLCs, SCADA systems or a handheld reader. Temperature lances are another alternative for temperature monitoring using the same advanced digital sensors, packaged in a compact spear. As they are highly portable, temperature lances can be used in flat storage warehouses or piles for checking smaller storage sites. The lances are simply inserted into the grain, and the temperature data is sent to a handheld reader. Up to 99 lances can be connected in one local network using just a single handheld reader for data collection from all sensors.



### Moisture monitoring

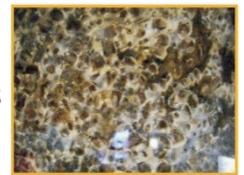
The iGrain digital moisture sensing cables measure ambient relative humidity at several points in the grain silo and use the data to calculate grain moisture using an Equilibrium Moisture Concentration (EMC) curve. In most silos, a single moisture cable is all that is needed to monitor grain moisture content. Accurate, digital moisture measurement helps control losses due to spoilage that can occur if excessive moisture is present - or shrinkage, due to moisture loss caused by excessive aeration. Moisture sensor lances are available as well, similar to temperature lances. Moisture sensor lances also reads temperature and it can be connected to e.g. a hand held reader or a PC system with iGrain software. The iGrain Hand-Held readers reads up to 49 moisture sensors.



## Spoilage Detection

The iGrain Grain Sniffer detects spoilage in grain by monitoring the level of CO<sub>2</sub> in the silo caused by biologic activity, that is a result of insect infestation or fungus in the grain. A key advantage to the Grain Sniffer CO<sub>2</sub> monitor is that CO<sub>2</sub> travels relatively fast, often detecting spoilage faster than temperature monitoring. Because CO<sub>2</sub> is a gas, it can travel through the grain mass and it can be detected at very low levels.

FUNGUS ATTACK

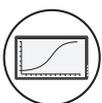


GRAIN WEEVIL ATTACK



## Level

The iGrain Grain BIN-AUDITOR is a very precise “plumb bob” grain level measuring device for measuring grain levels with a very high accuracy of a few centimeters. Unlike level measurement devices based on wave reflection (laser, radar, ultra-sound etc.) the plumb bob devices does not require regular cleaning of sensors and the level measurements is immune to dust. In connection with the iGrain Inventory Manager Software the Bin-Auditors provides: Level Measurement, Inventory Trend Curves, Theft and Spoilage monitoring etc.



## iGrain Dashboard Manager

The iGRAIN DASHBOARD MANAGER is the platform from where all storage and monitoring data can be displayed in a comprehensive overview. The Dash Board “Front Page” literally contains all information about the stored grain condition and all control data: Grain Temperature, Grain Moisture, Grain Level, Grain Volume, Grain Weight, Weather Data, Aeration ON/OFF Status, Spoilage Indication and Grain and Ambient CO<sub>2</sub> Concentration. Data read out can be on a System PC, tablets or on smart phones.



## Aeration

The iGrain software offers an Aeration Control Module that controls both the main aeration fans and roof exhaust fans. The system uses temperature and moisture data from sensor cables and data from the weather station, to optimize aeration and avoid infestation. The system can target a specific temperature and grain moisture.