iGRAIN®

Manage all your grain efficiently

iGRAIN Smart App

Shows infestation and storage *RISK FACTOR*

How it works

The iGRAIN Monitoring System is making an intelligent evaluation of all monitoring data and calculating the **RISK FACTOR**.

Data from the monitoring system is sent to the iGRAIN Cloud Server. Here the calculations are made, and the APP is executed, and updated in real time when the APP is contacted. The client must use a password the first time he accesses the APP from a new device.

Important:

The APP is intended to work with the iGRAIN SNIFFER (CO2 Infestation Monitor). It is the CO2 sensor that makes the calculations and report conclusive. This means a given silo plant can monitor the grain based on either the iGRAIN SNIFFER that also has one temperature sensor included, or the data can be supplemented with any existing temperature monitoring system. This increases the validity and the reporting quality a little.

- Calculates the infestation
- Showing the stored grain Risk Factor (1-6)
- Showing the maximum safe storage time
- Showing your inventory

iGRAIN®

Manage all your grain efficiently

Avoid infestation and spoilage

iGRAIN Smart App Overview

Site: Jensen's Feed Mill			Action Required: YES		Time Stamp: 28.08.2018		
Silo	% Full	Ton	Grain Quality*	Relative Rating	Max storage	CO2	Temp (avg)
HACCP			CCP 1			CCP 2	CCP 3
Silo 4	88	1854	5,1	1/6	0 weeks	2943	28.1
Silo 1	92	1044	3,6	2/6	4 weeks	1904	31.0
Silo 6	73	2698	3,4	3/6	4 weeks	2101	25.6
Silo 3	30	2288	2,7	4/6	20 weeks	360	26.8
Silo 2	11	4682	2,3	5/6	22 weeks	411	25.6
Silo 5	98	3086	1,4	6/6	52 weeks	317	26.8
Weather Data: T= 17,8° Hum= 71% rH - T_{24}= 23,8° H_{24}= 54% rH					Climatic Zone: Temperate		

Primary function of the iG-HACCP-APP is to give:

1. Operational assistance with validated data for decision-making
2. Provide QC data for any host QC system. This is done with primarily Critical Control Points. These CPPs can be supplied in the integral HACCP table, and the user needs to add his own decisions on corrective actions etc. relative to his QC system.
The iGRAIN DASH BOARD MANAGER has a module for this integration, but this module is an existing product and not part of this new invention.
3. HACCP versus HARPC
It has become more common to apply both HACCP and HARPC Systems. HARPC systems (Hazard Analysis and Risk-Based Preventive Controls) is likely to become more popular as legislative requirements increase in the food supply chain. In any case the CCPs from the iGRAIN APP can of course be applied to both systems, and secure proper quality management.

Advantages:

A. Daily QC data, automatically
B. Stable and validated inputs to the QC system
C. The platform to integrate with local QC system is easy to set up because the iGRAIN cloud database is a standard SQL database on Microsoft Platform

iG-HACCP is designed based on CO2 monitoring the iGRAIN SNIFFER.
This makes it EASY for grain managers to utilize CO2 monitoring (and can also integrate other sensory information like temperature monitoring to its fullest extent and get a VALIDATED MEASURE of the Grain Quality.
The APP communicates to the GRAIN MANAGER and to QC SYSTEMS (HACCP), and gives definite answers to the grain quality condition.

Risk Factor

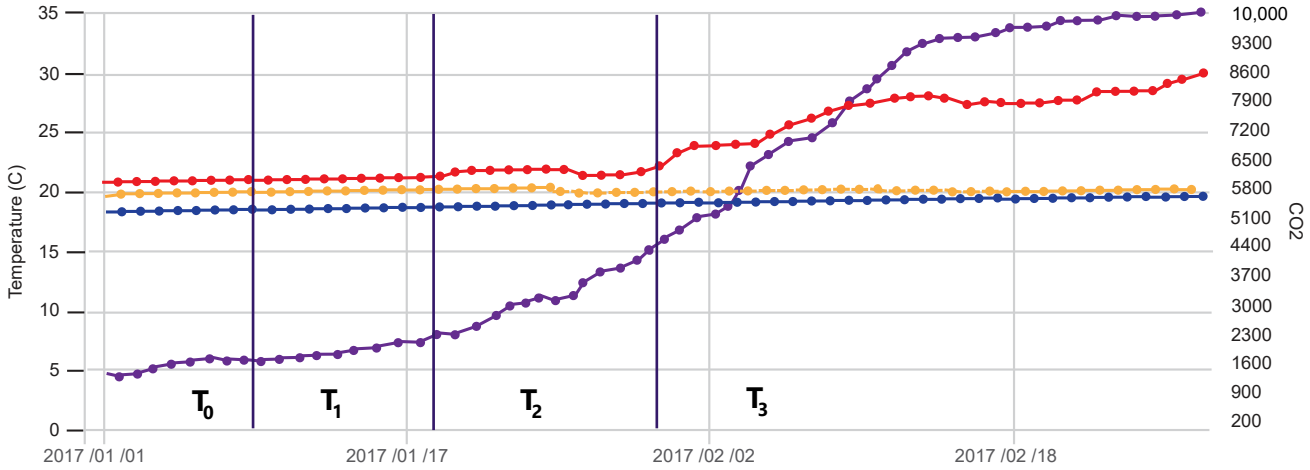
It reports the true grain condition and shows how safe it is with the RISK FACTOR.
It gives both an absolute quality mark (the RISK FACTOR) and lists ALL bins ''worst to best'' so grain managers can take the right decision about which bin to focus on and make operational decisions about.
The focus of the product is to MAKE GRAIN MANAGEMENT EASY - BASED ON VALID DATA and has consequently also been designed for EASE OF USE and ability to INTEGRATE with QC systems.

Risk Factor - overview

Risk Factor 1-2: Safe grain - no infestation
Risk Factor 3-4: Safe grain, but starting infestation
Risk Factor 5-6: Infested grain - action needed

iGRAIN Monitoring in Realtime

The below curve show how the iGRAIN SNIFFER works in the Dash Board.



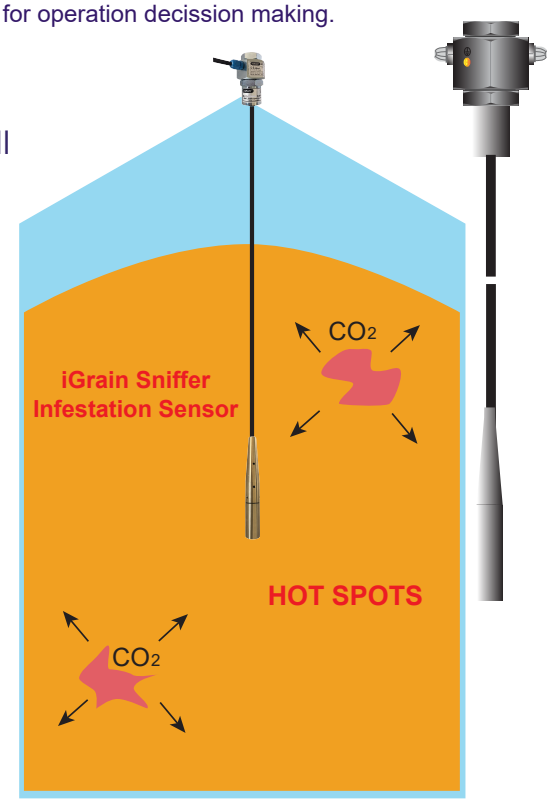
BLUE = coldest sensor point in the bin. **ORANGE** = average of all sensor points. **RED** = warmest sensor point in the bin. **PURPLE** = CO2 concentration in the bin.

This illustrates how superior the iGrain Sniffer is compared to simple temperature monitoring.

Above you can see the monitoring trend curves for GRAIN TEMPERATURE and GRAIN CO2 development. Note the time phases:
T1: the temperatures are constant, yet the CO2 curve shows that biologic activity is in progress - CO2 reaching 2000 ppm.
T2: Temperature still stable but grain spoilage is already in progress - CO2 reaching 5000 ppm. **T3**: High temperature curve starting to show increase going from 23 to 30 deg. C. CO2 is now reaching 9000 ppm showing substential spoilage.
T4: High temperature curve stabilised, yet CO2 increasingly growing beyond 10.000 ppm (1%). Grain spoilage rate estimated to 0,1% / Day ! = substantial spoilage. Despite 86 temperature sensor points in this 3000 ton wheat bin, the true condition is only revealed when looking at the CO2 curve. This also show how valuable the CO2 information is for operation decission making.
This grain should be mooved or consumed immediatly.

General description

The iGRAIN SNIFFER is an advanced CO2 sensor system that will detect stored grain spoilage at an early stage. It is superior to temperature monitoring, and will find a HOT-SPOT before temperature monitoring.It is based on detecting any unwanted biologic activity from insects, fungus etc. in the stored grain. Because is a gas it will migrate through the grain mass so only one sensor is required in each bin or storage cell. Because the generation of CO2 from unwanted biologic activity is rather small, and because the ambient level of CO2 changes, a sophisticated technology is detecting the rise in CO2 levels immediately and alerts about the biologic activity.



Advantages of an iGRAIN CO2 Sniffer

- Detecting the infestation level within 24 – 48 hours
- Helps detect if grain has the quality promised by the supplier right after receipt

iGRAIN®

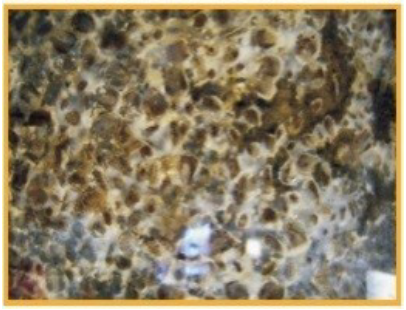
Manage all your grain effiently

How to benefit from iGRAIN Smart App

iGRAIN HACCP App

Insects

Insects pose a big risk in all types of grain. HOT SPOTS are most often started as an insect attack, and later develops into fungus attack



Fungus

When a HOT SPOTS develops inevitability the fungus will lead to Mycotoxin contamination.

Problem:

During last decades the entire grain storage industry has experienced increasing problems with their storaged grain. More spoilage and shrinkage have been seen than before.
Those losses are almost entirely due to the biologic activity (attacks) from insects and fungus.

It is therefore more necessary than ever to monitor the storaged grain. And it must be done in a way that grain managers understand and give them the best possible tool to act quickly when infestation is detected.

Many grain storage facilities, whether trades or millers, are still using ''first in first out'' principles for consumption/sale ... and this is not good idea since good grain may be consumed instead of slightly infested grain that should have been consumed now rather than waiting.

If grain consumed in the best sequence, i.e. the grain that is currently most at risk... for sure this will save serious spoilage in the long run !

Solution:

The iGRAIN APP: IG-HACCP-APP is solution to this problem:
1. The APP will always point to the most infested grain
2. The APP calculates the RISK FACTOR (A number between 1 and 6. 6 is worst)
3. The APP predicts a maximum storage time based on current condition, climatic condition and other data available.

Altogether, this APP, (whether used on a smartphone or on a PC) will provide the grain manager with validated data so operational decisions about the grain can be taken in a safe and well document away.