

# e-SILO

SOLUTIONS REVIEW #2

# Ronin GMS

## THE BASICS OF NIR/NIT SPECTROSCOPY



*Bruins AgriCheck  
(NIT)*



*Bruins AgriCheck Plus (NIT/NIR)  
(Bulk density optional)*



*Bruins InfraScan  
(NIR)*



*Bruins MultiCheck  
(NIT/NIR)*



*Dickey-John InstaLab  
(NIR)*

*Near Infrared Spectroscopy has been used for decades in many industries to provide rapid and precise constituent analysis. Near Infrared Reflectance (NIR) and Near Infrared Transmittance (NIT) are used by analytical OEM's like Dickey-John and Bruins Instruments to offer a range of analysers to the grain handling, milling, feeds, processing and dairy industries.*

Each instrument within this range has a unique spectral range and sample presentation device for its special application. Different products require diverse sampling and presentation techniques to either increase accuracy and stability of calibrations or the ease of use. This technology offers fast and accurate constituent analysis and lays the foundation for trade and value determination.

Near infrared spectroscopy is based on the absorption of infrared radiation by constituents such as protein, oil, starch, carbohydrates and moisture. This absorption is measurable and occurs because such constituents individually resonate at specific frequencies within the infrared spectrum. This resonance will cause interference and thus absorption of that particular spectrum of infrared light. This occurrence is recorded and translated by spectrophotometers. Two of these methods of Near Infrared spectroscopy,

NIR and NIT, is used by Dickey-john and Bruins Instruments. The absorbance frequency normally indicates the technology to use but in Ronin GMS's case NIT is used for whole grains and NIR for powders, pastes and milled products such as flour. With NIT infrared light is transmitted through the whole grain sample and then measured. With NIR the infrared light is reflected from the surface of the sample.

The greatest strength of the NIT method is that it is quick, accurate, without intricate sample preparation and therefore limits operator input on the final result. These analysers are ideal for use in the intake offices of silos or production plants that have to obtain numerous sample results within a short period of time.

NIR analysers are more suited to millers, processors and quality control laboratories. Sample preparation and presentation are factors that might influence NIR results. Sample preparation has to be methodical in order to ensure that results are accurate and repeatable. Sample grinding or milling has a big impact on the results obtained, therefore the NIR instruments are calibrated with the associated mill or grinder. The main reason for this is that the ground sample particle size distribution can vary between mills produced by a single manufacturer.

To obtain good, repeatable results from a NIR instrument, it is necessary to maintain the same particle size distribution every time. Constituents like moisture and oil can also be affected by the heat generated during the milling/grinding process. Thorough training and sample preparation methodologies however promises success and makes NIR the most cost effective analysis solution.

Bruins Instruments is the first spectrophotometer manufacturer to offer both NIT and NIR technology in one instrument. This enables the user to explore different technologies for whole grain, pastes, liquids and powders. This technology has been around since the late 1960's but has been refined over the years.

Ronin GMS represents both Dickey-John and Bruins in South Africa and has a team of factory trained technicians to service and maintain these instruments. **es**

### IN THIS ISSUE

*Basics of NIT/NIR*

*Ronin Report.*

*The Importance of Testing for Moisture.*

# Ronin GMS

## THE IMPORTANCE OF TESTING FOR MOISTURE



*Whether you're harvesting, storing, milling or trading grain, few factors are more important to maximizing value than the moisture content.*

Any farmer will tell you that by accurately determining the moisture content of grain, a lot of problems can be avoided. Knowing the moisture of the grain that is on the field can make the harvesting process a dream or a nightmare with trucks either being returned or charged with high drying prices.

Silo managers will reinforce the importance of moisture testing by informing you of all the related risks during the storage period. "Hotspots" in bins, accelerated insect infestations and risky fumigations is high on their list. Excess moisture also

leads to condensation in the bins with water dripping from the roof on top of the grain.

Millers have a need for homogenous clean grain. They make up their gristing from different varieties and qualities of grain, but expect the moisture content to be very stable. During the tamping process the moisture content is increased so that the outer layers can be removed with ease and without fraction. Stable, homogeneous moisture of grain is needed before you start this process to ensure a homogeneous tamping process. Moisture plays a huge role in terms of extraction and milling yield.

Traders are also involved by establishing prices that are based on maximum allowed

moisture percentages and enforcing it by deducting mass from contracts for excess moisture delivered. Transporters normally sit in the queue or haste the wet load back to the point of dispatch until the dispute is finalized.

It should be quite evident by now that by determining the moisture content at harvest, storage, milling and point of sale means extra Rands in the bank.

Ronin Grain Management Solutions is the authorized distributors of Dickey-John and Sinar moisture analysers. Ronin GMS is uniquely positioned to offer each tier of the grain industry specialized support and equipment that is specifically tailored to their particular needs. **eS**

## THE BEST OF BOTH WORLDS FULL NIT AND NIR (WITH LIMITED PREPARATION) WITH OPTIONAL BULK DENSITY DEVICE

### AGRICHECK PLUS



Ronin GMS is the appointed distributors for the following brands in South Africa:



# Ronin GMS

## RONIN REPORT: SPOTLIGHT ON BDA

*Due to its activities in the grain industry Ronin GMS has developed sophisticated stock and risk control systems that has led to a diversification of its portfolio.*

The ART system, used at silo sites to monitor bin levels and other variants, was the first such system. AIMS and ARTEMIS followed thereafter.

AIMS was developed to audit open air stock piles and bunkers. It is a free standing unit comprised of a laser, tripod and a computer running proprietary software.

This system can be used by an single operator or a team to accurately determine the occupied volume and mass of a stock pile or bunker in three dimensional space.

Bulk density samples and then used to compute total mass. Our sister company, Ronin Independent Surveyors, are active in the shipping industry and they also use this system for audits.

The ARTEMIS Laser scanning system is used for stock control in bunkers. Lasers are mounted at specific points which scans stock within at regular intervals. Information is relayed to a work station where stock levels and movement can easily be monitored and recorded.

Ronin GMS is constantly refining these systems and developing new ones for other applications. The latest augmentation to the AIMS system is the BDA (Bulk Density Analyser). It is a mobile automated hectolitre device that accurately and easily measures the bulk density of stock piles.

This device has been designed and engineered by Ronin GMS at its Johannesburg premises. The device has a 100l bucket that is filled in 3 stages to ensure proper



*The Bulk Density Analyser*

compaction of the sample. A 100l container mounted into a wheelbarrow configuration, is manually filled and docked with the BDA. The unit is then winched up along rails and deposits its load in a second 100l bucket. Once it is filled the bottom of this bucket is opened. The final 100l container, a cylindrical steel drum, is filled and moved onto the scale. When it is moved onto a scale the levelling blades ensure that the drum is filled to the level. The drum is then weighed.

This cycle is repeated to obtain reliable data applied by the AIMS software to generate the overall mass of a stock pile by combining mass and density data with occupied volume.

Once an AIMS audit has been completed an report is generated. This report typically contains mass, density, volume and a three dimensional representation of an audited stock pile or bunker. Managing your risk has never been more reliable and affordable. **eS**

### BULK DENSITY ANALYSER

### BULK DENSITY ANALYSER

*Branding on the BDA*

# RAIN DAMAGE?



*The RVA-Ezi is configured to measure pre-harvest rain damage in wheat and barley. It provides a simple 3-minute objective test for grain soundness at receipt or at the mill. Reports results in cP, SN (Stirring Number) or FNe (Falling Number equivalent).*

**RVA-Ezi**