

# The Importance of Grain Analysers & Why You Need The Very Best



In a rapidly evolving precision ag environment, it can be difficult to identify which technology will make the biggest difference to revenue and should be invested in with priority. In such a complex web of factors influencing overall yield and grain quality, a high-quality protein analyser delivers immediate returns for savvy farmers, even when utilising the exact same techniques and strategies.

**Nothing is more crucial in grain production than accurately gauging the quality of harvest.**

**Without a reliable method of grading grain and determining how to separate it, revenue will inevitably fall short of its true potential. Investing in a quality grain analyser helps maximise**

**returns on your harvest and – particularly with an on-harvester protein analyser – allows the impact of various techniques to be gauged according to their mapped location.**

As a leading producer in the agricultural industry, you'll understand that there's more to grain than meets the eye. The concept of grain testing isn't new, but advances in agtech have revolutionised the speed and accuracy of this essential process. Gone are the days when small samples had to be sent away to an agronomist's lab, only to receive limited information and little idea of how to optimise your field's performance. On-farm grain analysis has truly changed the game and the latest technology makes it easier than ever to evaluate your grain while mapping your field's quality in real time.

Accurate grain analysis replaces speculation and estimation with certainty when it comes to protein, moisture content and oil percentage, ensuring no misrepresentation is risked and giving confidence to buyers. Using reliable data to separate grain also opens up new opportunities and new markets for part (or all) of your grain yield. Whether it's more profitable to separate grain by quality or mix the grain is a crucial decision that requires extremely accurate data.

That's a big reason why quality and precision is so important when buying a grain analyser – cheap models often fall short of the kind of accuracy required for market success, and relying on a benchtop grain analyser restricts the data's usefulness when compared to on-harvester models.

An advanced grain protein analyser does far more than isolate inconsistencies and subpar grain – it's an essential channel of feedback on any changes to the process or new techniques implemented over the season. While this advanced ag technology was previously the domain of grain buyers and handlers, more and more farmers are adopting the industry's best grain analysers for their own use and reaping the benefits for themselves.

But what's the best grain analyser to invest in? Does my farm really need a grain analyser? How will a protein analyser improve my production process? This article answers these important questions and more. We will also guide you through all the things that you should know about a grain analyser, including the benefits that it can give, factors to consider, different kinds, and our top recommendations.

## Table of Contents

- [What is a grain analyser or protein analyser?](#)

- What are the benefits of a grain analyser?
  - Comprehensive quality check using the same technology as your buyers
  - User-friendly precision ag tool which provides strong ROI
  - Accurate and speedy grain analysis made easy
  - Nitrogen management for increased yield and quality
  - All data is logged and recorded for long-term analysis
- What should I consider when choosing a grain analyser / protein analyser?
  - Is it portable?
  - Which grains does the device measure?
  - What servicing or maintenance does it require?
  - Does it come with a warranty? What does the warranty cover?
  - What type of power supply does the grain analyser need?
  - Does the instrument measure whole grain or ground grain?
- What kinds of grain analysers / protein analysers are available?
  - Benchtop Grain Analyser
  - Portable Grain Analyser
  - On Combine Grain Analyser
- How does an On Combine grain analyser work?
  - On Silo & In Line Grain Analysers
- What are the benefits of on combine grain analysers?
- What are the best On Combine grain analysers available?
  - CropScan 3000H
  - CropScan CNH 3300H
- Where can I purchase a grain analyser/protein analyser?

## What is a grain analyser or protein analyser?

A grain or protein analyser is an infrared device which scans your grain or oilseeds and evaluates their condition. 'Grain analyser' and 'protein analyser' generally refer to the same piece of equipment – while protein content is one of the key measurements, the majority of devices provide a wealth of additional information to assist farmers.

Some of the factors gauged by a grain analyser include basic evaluation of size and colour as well as protein content and moisture content, plus the key measurement of oil percentage in oilseeds.

Nitrogen levels are also gauged and mapped to assist with nitrogen management and fertilisation.

Any defects or inconsistencies in the grain can also be detected at this stage, helping to assure consistency and quality that will definitely satisfy buyers.

How does an NIR grain analyser work?

A grain analyser uses near infrared spectrometry (or NIR) technology to accurately gauge the quality of cereal grains and oilseeds in a non-destructive manner. By passing near-infrared light through a grain sample, the device is able to determine valuable information about the grain's physical makeup.

While NIR technology in agriculture is a relatively recent development – particularly in terms of precision ag equipment for farmers rather than buyers and wholesalers – earlier technology still measures basic grain attributes such as size, shape and colour, detecting any possible abnormalities and separating sub-quality grain.

However, NIR or NIT grain analysers build significantly on that basic functionality to deliver much more useful information, including protein percentage and moisture content.

An on-combine grain analyser also stores additional data in real time, such as bin averages, field averages, and real-time protein maps. This additional GPS farm mapping component is a crucial tool when it comes to refining the production process and measuring the outcome of any new techniques.

In addition to the protein analyser itself, the hardware, the grain analysis process relies on software to process data into a usable format. The machine networks with a computer or tablet to process the values and present all the information in a convenient dashboard. The software itself makes the process intuitive and easy to use, and provides all the necessary data in a format easily interpreted by the farmer.

Many modern grain analysers use cloud storage for harvest data, allowing the information to be easily accessed via PC, phone or tablet by farmers and contractors. Data can also be exported and saved via USB where wireless technology isn't a viable solution.

## **What are the benefits of a grain analyser?**

Now that you know what a grain or protein analyser is and how it works, it is time to talk about how you and your farm or facility can benefit from using one.

Here are the key benefits of utilizing a grain analyser / protein analyser:

### **Comprehensive quality check using the same technology as your buyers**

As we mentioned, grain analysis not only identifies flaws in cereal grains, but actually quantifies the quality level and assists in grading grain. This allows you to make key decisions on whether to separate or mix grain for your market, sometimes even in real time on the field (in the case of on-

combine protein analysers). In the realm of agribusiness, knowledge is power, and grain analysis helps you better position and market your product.

Grain buyers and wholesalers have been using infrared grain analysis for years, and it makes perfect sense that farmers should be empowered with the same knowledge about their own product. Of course, delivering a subpar product can really hurt your business and your reputation in such an insular industry.

Separating low- and high-quality grain can also maximise the overall profit you receive in comparison to mixed grain of indeterminate grade. It's also crucial to find the right buyer and the right sales channel for each grade of grain – from the best of the crop to animal feed or malt barley – ultimately providing the best return on investment across the entire harvest.

## **User-friendly precision ag tool which provides strong ROI**

The rapid pace of progress in agtech is leaving many Australian farmers in the dust, unsure of how to utilise new equipment effectively. Mastering agricultural software or other equipment can be complex and challenging in the beginning, but one of the many benefits of grain analysers is their user-friendly interfaces.

Cutting edge protein analysers are far easier to use and understand than earlier variants, and that's because the software does most of the heavy lifting. Protein analysers integrate directly to a computer, laptop, or mobile device (smartphone and tablet), which means it also has an app associated with the piece of equipment.

By crunching the data and presenting the key information in a handy dashboard, grain analysis is much simpler to implement than many other precision ag technologies on the market.

When you buy a grain analyser, you can also expect an excellent ROI given the fairly accessible prices of the technology. Unlike many precision ag approaches, a grain analyser is easy to install and can be used right away, without needing to accumulate data over several harvests to start drawing actionable conclusions.

## **Accurate and speedy grain analysis made easy**

These instruments provide accurate, fast, and reliable analysis – in the case of on-combine protein analysers, even in real time during harvest. Compared to the process of taking samples and perhaps even sending them away to an agronomist, having the technology on hand and available saves countless hours as well as plenty of money.

Consider the number of samples needed over the lifetime of your operation, the cost of having each one analysed and the limited usefulness and precision of the results, and it's obvious why investing in a grain analyser is both efficient and cost-effective. Installing an on-combine grain testing system reduces this time cost yet again.

Thanks to the hard work of precision ag researchers and software developers, the interface of a state-of-the-art protein analyser is also quite easy to use and interpret. Designed for use by farmers, employees and contractors, companies provide plenty of support for buyers and can help teach all staff involved in the harvest how to use the machinery effectively.

## **Nitrogen management for increased yield and quality**

A grain analysis also returns data corresponding with nitrogen removal in the soil. Having this data mapped using GPS and tailoring your approach to fertilisation according to reliable data is incredibly effective at boosting yield and quality – and it's all done as you harvest, without the need for separate soil testing.

There's never been a more effective way to consolidate this data in the one place, and integrations with your crop management software may even be available.

## **All data is logged and recorded for long-term analysis**

Another key benefit of implementing a grain or protein analyser is that the data gathered only increases in usefulness over time. When setting performance metrics and goals year to year, it's crucial to have a way of objectively measuring the results and evaluating whether you've met your targets.

And when implementing any other form of precision ag tech or innovation on your farm, a high quality grain analyser will allow you to objectively measure the impact these changes have on yield



and quality. And if any unexpected issues arise in the process, you'll pick up on it swiftly by analysing the composition of your grains.

Ultimately, accurately measuring the impact of any changes to your process allows for strategic thinking, informed investment in new innovations and, ultimately, the ability to experiment and find a competitive advantage that may transform your operation for the better.

Picking up on any subtle issues affecting grain quality will also lead to genuine savings, preventing problems from escalating and leading to more costly waste or subpar quality produce.

Ultimately, grain testing equipment provides specific and actionable data on key questions such as:

- **When to harvest for greatest grain quality**
- **Whether to mix or separate grain for the best price**
- **Whether to store or sell grain**
- **Which grain is the highest quality**
- **Which grain to sell versus use as animal feed**
- **What the true market value of your grain is**

## **What should I consider when choosing a grain analyser / protein analyser?**

Despite its fairly accessible price tag compared to many agtech innovations, it's still a purchase that requires a bit of thought in order to make the right selection. Knowing which factors to consider and what to look for when buying a grain analyser helps ensure it delivers the results you're looking for.

Here are some guide questions that you need to consider before choosing a grain analyser:

### **Is it portable?**

Thinking about your use case, it's important to identify the physical requirements your protein analyser will need to meet. It would be too simple to suggest that a portable grain analyser is an improvement on the benchtop variety – similar to the choice between a laptop computer or PC, there are pros and cons of both types.

The logistics of using a grain analyser is also a major factor when making a decision.

A benchtop or on-farm grain analyser will require you to collect samples and bring them back to the office for analysis, complicating the process of mapping grain quality.

A hand-held grain analyser (often integrating a moisture meter) is small and lightweight, able to be used on the go and on location, but functionality is more limited and samples must again be taken physically, meaning results must be generalised to a certain region and grain segregation is difficult.

An on-combine grain analyser is the latest and greatest innovation in protein analysis, allowing for state-of-the-art functionality and automatic mapping of results, as well as testing far more comprehensively and in real time. However, the price point of these more advanced models is naturally higher, even if the return on investment is excellent.

## **Which grains does the device measure?**

There are at least twenty-two types of grain grown commercially, and before you invest in a grain protein analyser, you'll want to be certain it's well-suited to your crop. Luckily, the process involved in infrared grain analysis is effective across different grain varieties and oilseeds, but the parameters used by the software to present results do vary according to crop variety.

It's a given that any grain analyser will be suitable for testing wheat and barley, but if your needs aren't as mainstream, it's a good idea to speak with the manufacturer or your farm machinery dealership before you purchase. Support for crops such as oats, rye, rapeseed, maize and soybean may be region- or market-dependent, so it's crucial to ensure your equipment is going to suit your crop varieties.

Reading reviews, use cases or case studies by other farmers with the same crop and similar sized operation can help identify whether a specific piece of equipment is the right choice for you.

## **What servicing or maintenance does it require?**

Much like all other forms of machinery and equipment, a grain analyser also needs regular maintenance. This is to ensure that it is always running at an optimal level and that the accuracy of the data is preserved.



Check with the manufacturer to see what type of servicing or maintenance the grain analyser requires. How often does it need to go through maintenance check? Does it require a technician? Or can you do the maintenance yourself? These are just some questions you need to ask to ensure that you can keep the grain analyser in tiptop shape.

## **Does it come with a warranty? What does the warranty cover?**

It's a given that any piece of farming machinery purchased will have some form of warranty, but clarifying the details of the warranty should be a key step of any purchase. Normally, a warranty lasts for at least one year to about five years, and both the manufactory and machinery dealership may have different warranty terms.

Aside from the duration of the warranty period, you also need to consider the rest of its scope. This includes factors such as maintenance or servicing, returns, damages, etc. Warranty terms may be voided if you use the equipment for an application or under circumstances that aren't recommended (eg. extreme heat or inclement weather) – so find out all the details upfront to ensure you're covered.

Keeping track of any maintenance and servicing requirements will also help maintain the validity of your warranty.

## **What type of power supply does the grain analyser need?**

Especially when working in remote areas, it's crucial to know how your grain analyser needs to be powered. A desktop on-farm grain analyser is likely to need mains power like any other appliance, while portable or handheld grain analysers will still need charging from time to time. Battery life may be a consideration when choosing one of these portable NIR grain analysers.

## **Does the instrument measure whole grain or ground grain?**

When it comes to protein analysis, many kinds of equipment are designed to test ground grain or flours rather than the raw material. Some may be suitable for both, but need to be calibrated properly to work with either whole or processed grain.

At the end of the day, grain testing equipment intended for buyers is ultimately very different to the needs of primary producers. When choosing an on-farm grain analyser, it's worth having an in-depth conversation with your equipment dealer to ensure you purchase the right option.

## **What kinds of grain analysers / protein analysers are available?**

There are four kinds of grain analysers available on the market, each with its own pros and cons. For your benefit, we've provided you with a brief but comprehensive description of each.

### **Benchtop Grain Analyser**

Benchtop grain analysers are larger machines designed to be kept indoors, but still handy for on-farm grain analysis. These machines test a sample in order to measure protein level, moisture, oil percentage and more. Some varieties deliver a more comprehensive analysis including fiber and starch.

### **Portable Grain Analyser**

As its name suggests, a portable or handheld grain analyser is a smaller version of a larger machine designed to be used out in the field. It enables you to measure grains and other produce on-the-go, and may allow for GPS mapping of the results. These varieties are also lightweight and easy to carry, but often have fewer features and less precision than desktop models.

### **On Combine Grain Analyser**

One of many brilliant innovations in precision ag, On Combine grain analysers can be fitted to existing combine harvesters to monitor grain quality in real time. The advantages of this technology are plentiful, providing real time analysis for siloing decisions while offering far greater functionality than handheld models.

# How does an On Combine grain analyser work?

Simply put, optical scanners are installed inside the harvester, using near infrared technology to evaluate grain non-destructively. This helps measure the moisture, oil, and protein of oil seeds and cereal grains while the combine harvester strips them from the ground. For more about on combine protein analysis, keep reading below.

## On Silo & In Line Grain Analysers

In its most basic sense, these instruments measure the protein, moisture, and oil percentage of the grains that are passing through an auger, a conveyor belt, or through a pneumatic pump. While this does help quantify the quality of grain, the decision of whether to separate or mix grain cannot be made in the field prior to siloing.

## What are the benefits of on combine grain analysers?

We've touched briefly on the benefits of an on combine grain analyser, but let's unpack that in a lot more detail – and if there's one piece of technology you should consider adopting before next harvest, it's a cutting edge harvest analysis tool like this.

An on-combine protein analyser will naturally measure the starch, oil percentage, moisture, protein and nitrogen levels of your grains. However, it's the real time feedback during the harvest and real time farm mapping technology that elevates the on-combine model to an industry leader.

On combine protein analysis enables the key decisions around separating or mixing grain to be made in the field, based on reliable, instantaneous and spatially accurate data. Save yourself and your staff countless hours in grain handling and processing by making key decisions right there in the field, well before siloing.

Precise data on the quality and composition of grain is also incredibly powerful when mapped, particularly when you're able to compare the results with your existing farm mapping records.

Whether you're applying techniques such as variable rate fertilising or experimenting with new processes, on-combine grain testing lets you view the tangible outcome of any changes.

Various studies in agriculture have been performed around the benefits of harvester grain analysis, demonstrating increased yields and increased profits up to 20% or 30%. Efficiency is also increased by up to 5% when eliminating unnecessary processes and streamlining the harvest-to-silo pathway.

## **What are the best On Combine grain analysers available?**

The two leading near infrared grain testing systems are CropScan 3000H and the CropScan CNH 3300H, both manufactured by Next Instruments. As an Australian industry leader on the forefront of grain testing technology since 1997, it's no surprise that the release of the updated CropScan CNH 3300 has been highly anticipated across Australia.

But how does the CropScan 3300H differ from the previous 3000H model? Let's compare the two below.

### **CropScan 3000H**

The CropScan 3000H is the predecessor of the CropScan CNH 3300H and is an Australian-made Near Infrared Transmission spectrometer. This model has reigned as the best in the industry for years, and despite being an older model, still outperforms many of its competitors. This model provides farmers with field maps for starch, moisture, protein, and oil while their grains are harvested, all processed and calculated in real-time.

This piece of farm tech aims to help farmers through blending grain based on the parameters set for oil, starch, and protein. Among many scientific studies performed using the CropScan 3000H, results included a 10% to 20% increase in crop revenue and a 20% increase in harvest efficiency, leading to significant labour savings.

Grains and oil seeds contain about 3% sulfur and 17% nitrogen. Since this is the case, farmers can generate sulfur and nitrogen removal maps by measuring the protein and gathering the yield data from the combine harvester. This model also integrates with a computer using wireless technology.

## CropScan CNH 3300H

The newest release from Next Instruments is this [CropScan CNH 3300H](#), the leading grain analyser on the market today. This newer model shares many similarities with the older one CropScan 3000H, but also adds plenty more features designed specifically to increase farm efficiency and profitability.

The CropScan CNH 3300H has a better built-in sample head, allowing you to increase the flow rate of grain. Aside from that, it also decreases the scan time to 5 to 10 seconds per measurement, once again boosting efficiency and allowing for more detailed data.

Another new feature is the integration of a compatible tablet, providing a more user-friendly and straightforward experience for the combine operator. Since we are talking about technology, this improved model integrates everything through the cloud, referred to as the CropScanAG cloud. This enables users to capture and save all data regarding moisture, oil, yield, protein, and GPS data from the CropScan CNH 3300H to the cloud server, providing a central point of access for all staff and contractors across the entire operation.

These additional perks are free with purchase of the on-combine analyser, adding significant value to an already fantastic investment.

## Where can I purchase a grain analyser/protein analyser?

For the greatest customer experience and post-service support, choosing the right farm machinery dealership is absolutely essential.

In Australia, you can [purchase directly from Boekemans Machinery](#), a family-run used and new farm machinery dealership based in Western Australia. Aside from offering competitive prices on the best grain analyser brands, Boekemans Machinery also offers supply and fit services and exceptional after-sales service.

With over 50 years experience, expert product knowledge in precision ag and a customer-centric approach, there's no place better to purchase grain analysers and other top-of-the-line farm equipment. Contact Boekemans Machinery to enquire about fitting an on-combine grain analyser and experience the difference for yourself.

*Disclaimer:*

*This article is published for general informational purposes only and does not constitute professional advice. Any action you take upon the information you find on this website is strictly at your own risk. Boekeman Machinery will not be liable for any losses and/or damages connected with the content of this article.*



## **Ben Boekeman**

Ben Boekeman is head of Sales & Precision Farming at Boekeman Machinery and a third-generation member of the Boekeman family. Working out of our Wongan Hills branch, Ben is passionate about the agricultural industry and the future of precision agriculture.