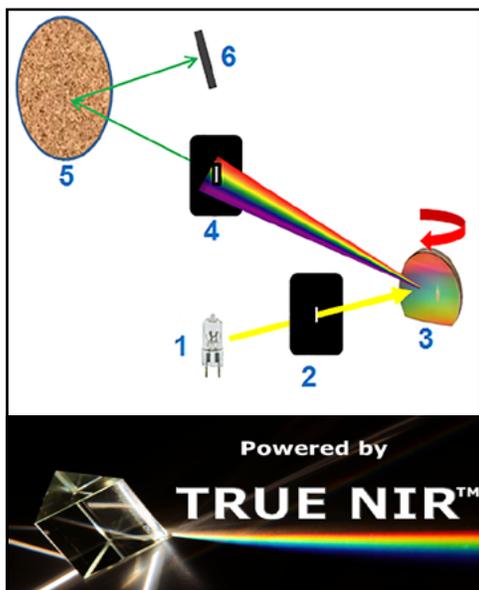
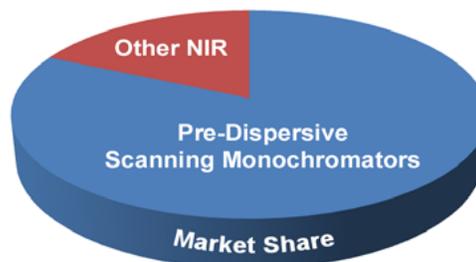


The Pursuit of the Perfect NIR Measurement

TRUE NIR is a program at Unity Scientific to develop and implement the most accurate and reliable spectrophotometers. This goal drives our research and development program to find higher quality components, new technologies; and for our production and service teams to develop improved and more reliable methods for assembling and servicing our instruments.

The result is reliable analyzers that you can trust day in and day out to provide you with accurate measurements and trustworthy results.

- **Pre-Dispersive spectrophotometer**
- **Highest grade optics**
- **Custom InGaAs detector**
- **First principles calibration**



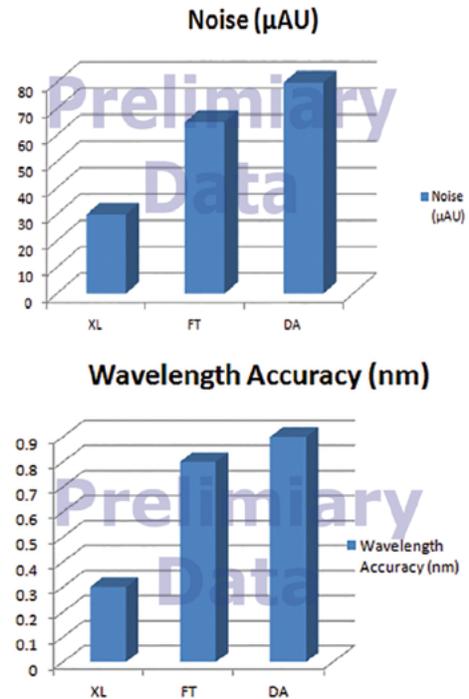
Pre-Dispersive Spectrophotometer

TRUE NIR begins with the basic design of the instrument and the technology employed to collect the spectra. For bench instruments in laboratory and at-line process installations, TRUE NIR specifies a pre-dispersive scanning monochromator as the highest performance optical bench that produces the highest quality spectra.

While there are other technology platforms used in the design of NIR instruments including filter, diode array (DA) and fourier transform NIR (FT-NIR), pre-dispersive scanning monochromators provide the best combination of features and benefits when analyzing natural products including food and agricultural products. For this reason, more than 80% of NIR instruments used for these applications are based on pre-dispersive scanning monochromators, as are the vast majority of NIR calibrations for food and agriculture products.

Pre-Dispersive Spectrophotometer Advantages

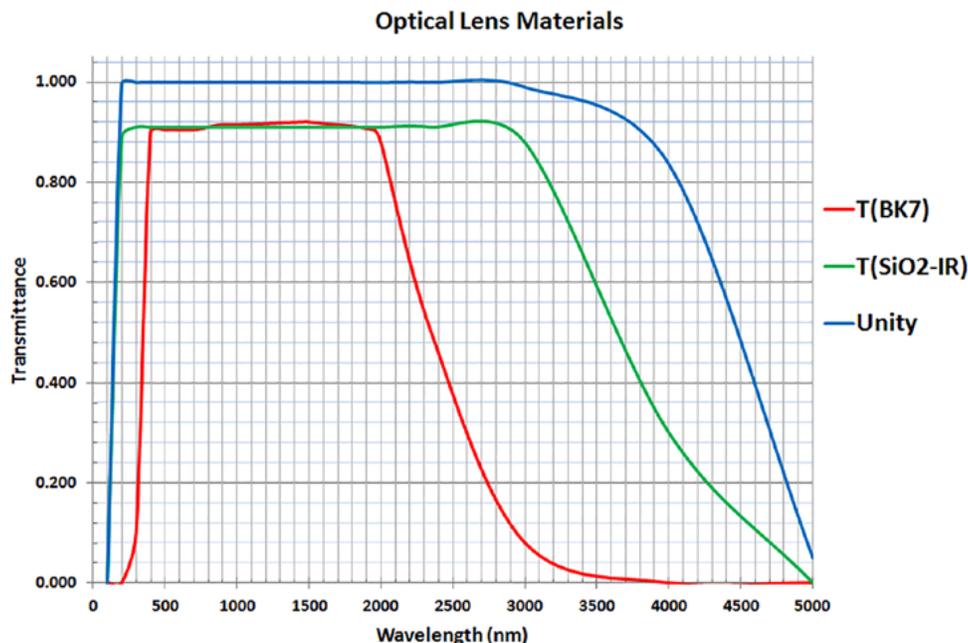
- Lowest noise resulting in superior measurement precision
- Excellent photometric and wavelength accuracy as compared to standard reference materials (SRMs)
- Resistant to vibration, moisture and dust
- High reliability and low cost of ownership for instrument, lamp and consumables.
- Spectra are precise and compatible to other monochromator systems and most NIR databases, which have been collected using pre-dispersive instruments
- Outstanding spectral quality means fewer samples required for creating and validating NIR calibrations and more efficient use of reference chemistry resources
- High quality of spectra collected allows for precise calibration of instrument which facilitates easy calibration transfer and return to the original state after any needed repairs.



Highest Grade Optics

TRUE NIR starts with the top quality components including highest grade commercially available optical materials with more than 99% transmission from the visible range through 3400nm. Higher transmission with fewer spectral features result in more efficient optical designs that require less energy to collect and transmit the light energy. More pure transmission spectra also result in fewer spectral artifacts and more repeatable measurements across instruments.

The chart below illustrates the superior performance of the optical components employed in TRUE NIR spectrophotometers in comparison with optical materials commonly used by competitor instruments.



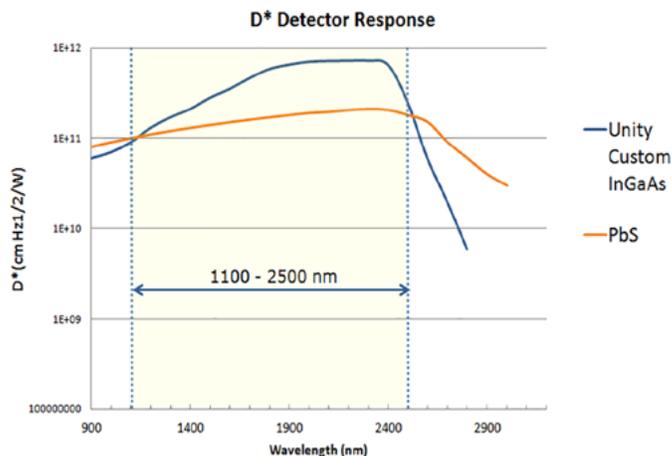
Custom InGaAs Detector

TRUE NIR implementation extends to signal detection where the reflected energy is collected and quantified on a state of the art, ultra-cooled, custom extended InGaAs detector. The detector was chosen for superior sensitivity, wide dynamic range, and ultra-fast response times.

A widely used specification to describe the sensitivity of detector materials is D* Specific Detectivity. As shown in the chart to the right, the TRUE NIR custom InGaAs has a higher D* spectral response 1100 - 2500 nm than PbS detectors found in competitive instrumentation.

InGaAs detectors are also extremely fast, which means that there is a tighter link between the signal collected and the grating position of the spectrometer. As a result, the spectrophotometer is more responsive as the grating position changes as the sequential wavelengths of the spectrum are collected.

The result is spectral information that has increased sensitivity and accuracy across the entire measured wavelength range.



Detector Temp.	InGaAs	PbS
- 30 C	0.01 μ Sec	1000 μ Sec
27 C	0.10 μ Sec	200 μ Sec

First Principles Calibration

TRUE NIR also describes our philosophy to configure and calibrate instruments. Unity Scientific follows the tenets of metrical science and first principles to configure and calibrate our spectrophotometers.



Metrical science dictates that the innate qualities or first principles of standard reference materials are used as targets for calibrating and evaluating instrumentation. By calibrating our instruments to National Laboratory traceable reference standard materials, the target is constant and the data collected are reliable and repeatable. Other companies use master instruments which drift and are unstable, thus the target of the instrument calibration is variable over time.

Calibrating instruments to first principles ensures that all instruments are calibrated to a constant state. This technique also future-proofs the data collected as the spectra are based on traceable standards and not a specific instrument image.



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