

# Application Note: Verax™ Gasoline Blending



## Minimizing Property Give-Away in Real Time

### On-line Measurement is Critical

Refiners know that Octane, RVP, and other property give-away is a critical concern in gasoline and diesel blending operations. It is simply infeasible to operate efficiently in today's markets while relying on grab samples, lab testing, and "touch-up" blends to meet specifications. Delays in sampling, analysis, and re-blending can reduce throughput by 15%. On-line analyzers are proven to enable efficient blending operations by allowing direct-to-pipeline blending or by minimizing residence time with in-tank blending.

### Current Technologies are Expensive, Slow, or Both

There are many options for on-line blending analysis, but it is important to carefully consider the benefits and drawbacks of each technology. On-line knock engines are slow and require significant maintenance; it's a similar issue for mechanical RVP analyzers and Gas Chromatographs along with their sample conditioning systems. Five minutes lag time at production volumes can mean hundreds of off-spec barrels. Optical measurements like NIR, FT-NIR, and Raman offer advantages in rapidity, repeatability, and ease of maintenance. Some optical systems, like JP3 Verax, do not require a sample conditioning system, further simplifying installation, commissioning, and maintenance.



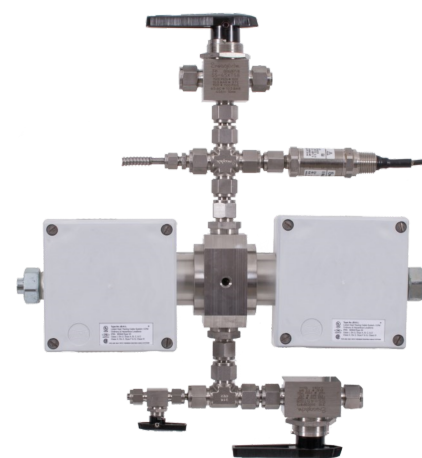
Verax NIR Spectrometer

### NIR Spectroscopy for Gasoline Blending Analysis

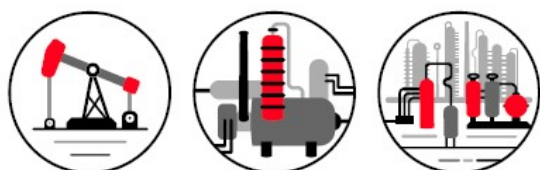
The JP3 Verax™ system uses an NIR spectrometer to determine the composition of a sample. The chemical composition of a fluid such as gasoline and gasoline blend ingredients determines its properties, such as vapor pressure (VP), RON/MON, distillation curves, gravity, etc. Therefore, with an accurate compositional correlation, NIR spectrometer results can be used to model and measure ASTM reference values, or any other accepted reference value. Each measurement produces diagnostic information that can be used to ensure the system is functioning properly.

### Rapid ROI with JP3 Verax

Utilizing the speed, power, and repeatability of the Verax system, refiners can minimize property give-away at minimal cost. One Verax system can measure multiple properties on up to four separate streams or read points, all simultaneously. Many other optical systems require a multiplexer to measure multiple streams: such a device contains moving parts and only measures one stream at a time, slowing overall measurement rates. FT-NIR and Raman systems are usually more costly than Verax, both for the instrument and for required environmental controls like a climate-controlled shelter and positive-pressure purge. JP3 Verax is designed for rugged, outdoor environments with an ATEX/IECEX or Class 1 Div II rating and no purge or temperature control requirements. This keeps installation, commissioning, and fiber costs to a minimum.



VeraSight Flow Cell



**Critical Data. Real Time.**

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## Expert Service and Support, Tailored to Your Needs

Almost all optical-based systems in gasoline blending will require chemometric models, which are developed by chemometricians using process samples. Most other optical analyzer manufacturers rely on the end user to create, develop and maintain these calibration models. JP3's in-house team of project managers and Ph.D. chemometricians offer a full range of support options: from hardware-only sales to full-service model development and support.

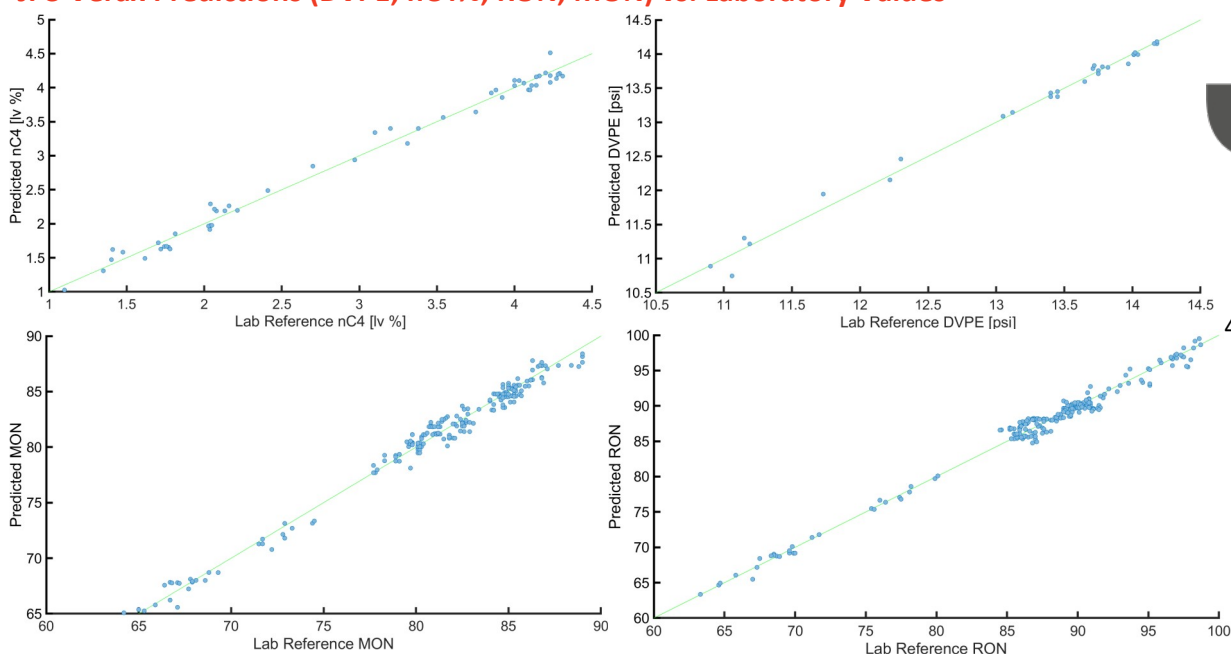
## Designed for Speed and Reliability

The highly reliable Verax analyzer provides analysis for up to four process streams in less than fifteen seconds per stream. Utilizing a highly stable and repeatable laser optical source, and packaged to operate in harsh environments with no shelter, the Verax operates in-line at process pressure and temperature. The VeraSight™ flow cells are mounted at the process points of measurement with fiber optic cable connections back to the control unit. All material is returned to the pipe, resulting in emissions-free operation. This means no sample conditioning or transport systems are required, thus improving response time and safety.

## Comparison of Analytical Methods

Method	Response Time	Fault Tolerance	Multiple Property Measurements	Environmental Controls	Initial Cost	Cost of Ownership
Lab Sampling	>30 minutes	N/A	Yes	No	\$	\$
On-line Mechanical	5-15 minutes	Moving Parts Require Maintenance	No	Required	\$\$	\$\$\$
Gas Chromatography	5-15 minutes	Moving Parts Require Maintenance	Application Dependent	Required	\$\$	\$\$\$
Raman & FT-NIR	~1 minute	On-Board Computer Diagnostics	Yes	Required	\$\$\$\$	\$\$
JP3 Verax	15 seconds	On-Board Computer Diagnostics	Yes	No	\$\$	\$

## JP3 Verax Predictions (DVPE; nC4%; RON; MON) vs. Laboratory Values



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