



ParaFuel™ Systems

NIR Analyzers for Octane and Fuel Parameters

Made for refinery support

ParaFuel systems from LT Industries are small, rugged analyzers designed for use in the refinery laboratory. Whatever the analytical need -- a quick test of a unit sample, support for blend optimizing or as a back-up for knock engine values -- a ParaFuel system can do the job. You can expect low cost, low impact on your laboratory procedures and low operator training loads from every ParaFuel system.



Easy to use, easy to own

Make fussy sampling procedures a thing of the past. Simply feed a 75 ml liquid sample into the sampling cell, using a syringe, pipette or hand pump and hit "Enter" on the controlling computer. ParaFuel system operation is automatic from that point forward. Receive your analytical results in less than one minute. Open the drain valve,

flush and you are ready for the next sample. And what about standardizing the system? All ParaFuel systems come with LT Industries' Universal Fuel Spectral Library. A few samples from your refinery source, another click of a computer key and the library matches your specific components.

Expensive? All LT Industries industrial NIR analyzers are inexpensive. ParaFuel systems are no exception. The spectrometer, software, Fuel Analysis Sampling Cell™ and the universal library are astonishingly inexpensive. Add your own computer and your system is ready to go.

The basic system

A ParaFuel analyzer includes a rugged NIR spectrometer and the patented Fuel Analysis sampling Cell. The cell eliminates the major source of aggravation and error in a fuel laboratory -- changes induced by contamination during testing. The cell has unique optics which vary the absorbing path length of the test sample during its assay. The result is a completely normalized measurement time after time.

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Near Infrared Technology at Work

The ParaFuel system also includes Iso-EZ™ software. Sophisticated analytical features are matched by on-screen “push-button” operation. And, it keeps archival records of your entire test workload.

Support Options

- **On-site application development**

LT Industries scientists will visit your facility, commission the instrument, develop the analytical model and train your personnel.

- **Remote Diagnosis via modem**

Suspect trouble? Need to add a new analytical model to your computer? Want a factory check of the system performance? Save the cost of a preventative maintenance visit while you receive the fastest possible response. Connect an interactive modem to the system, call LT Industries and our technicians can meet your needs over the telephone line.

- **On-line upgrades**

All ParaFuel systems are capable of remote analysis, even through optical multiplexers. The system contains the same rugged, internally standardized spectrometer drive that is used in LT Industries' Quantum 2000™ On-line Analyzers. These monitors are the operating heart of our PetroScan blend monitors, so they are more than equal to the task.

- **Software**

Iso-EZ Software includes SpectraMetrix and LightCal, the workhorse NIR chemometric programs from LT Industries. The operator application screens are designed for a “push-button” feel -- user functions are large, on-screen buttons with logically-designed sequences. The program includes an excellent package for instrument test and calibration with both archiving and print report functions.

- **VISTA Software for NIR Analysis** includes all of the functions of Iso-EZ software but in a Windows environment. The program interacts with both Windows 95 and Windows NT platforms. The package includes extensive model development routines and contains elegant pictorial views of the statistical data set.

- **TRANS Software** is LT Industries' highly-regarded calibration transfer program. These days, eighty percent of all pharmaceutical NIR analyzers are multiples: Similar instruments in use at more than one plant. With TRANS Software, a chemometric model may be developed once and transferred easily from plant to plant.

Why NIR?

The development of the analytical technique called Near-Infrared (NIR) spectrophotometry is generally credited to Karl H. Norris and William Hruska, scientists at the US Department of Agriculture. The developers applied both NIR vibrational absorptions and heterogeneous sample observation to agricultural materials during the 1970's. The applications of the resulting combined technique were both highly successful and wide-ranging. Virtually every grain elevator in Canada, for instance, uses a NIR spectrometer to blend differing wheat grades for revenue purposes. Crop harvests the world over are dependent on NIR values for payment to the farmer. Milk, sugar, seeds and textile crops such as cotton are all screened by NIR. There are many thousands of NIR instruments in agriculture: they have become a mainstay in harvest assessment and control.

The reasons that NIR is so widely used are its speed and its elimination of the need for sample preparation. In analytical chemistry terms, agricultural products are difficult: sample sizes, average weights and matrix compositions differ markedly, and analytes are often masked by proteins, moisture and long-chain hydrocarbons. When a harvest is underway, the chemist faced with an avalanche of quality-control samples would never be able to provide timely Kjeldahl nitrogen values for example. Rapid, passive NIR can do so, however, and so has become a virtual necessity.

The petroleum refining industry uses NIR analyzers for the very same reasons: speed of measurement, freedom from sampling restraints and reagents, affinity for point-of-use testing. With the advent of gasoline reformulation standards in 1998 and 2000, blending latitude will become much more limited. Time is already at a premium, so NIR is becoming a mainstay.

Want more information?

LT Industries publishes **The NIR Desk Reference**, a handbook to aid in understanding the principles and applications of NIR. Write for a copy.

Spectrometer Specifications (Basic Unit)

Reliability:	Designed for twenty-four hour operations without shut-down.
Spectral range:	900 - 1800 nm
Scanning speed:	2.5 scans per second
Spectral addition:	Scans may be added under computer control
Measurement mode:	Transmittance, automatically compensated in the cell
Data interval:	1 nm (1200 points over the spectral range)
Bandwidth:	10 nm
Photometric range:	4 Absorbance Units
Photometric noise:	< 40 μ AU, 15 μ AU typical (0 AU absorber, 50 scans averaged)
Wavelength accuracy:	<0.015 nm
Wavelength repeatability:	0.01 nm
Stray light:	0.1% or better
Light geometry:	Optimized for minimum specular reflectance and maximal S/N
Auxiliary port:	Computer controlled for alternative sampling
Possible signal output:	Multiple 4-20 mA, multiple voltages
Power:	120V, 3.5 Amp, 60Hz or 220V, 1.8 Amp, 50 Hz
Power transients:	Filtered
Dimensions:	12" x 15" x 13" (HWD) 30.5 cm x 39.7 cm x 34.9 cm (HWD)

Specifications subject to change without prior notification

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