Process Insights™
Premium Insights Into Process

NEXT GEN FTIR/FT-NIR ANALYZERS

PRODUCT DATASHEET

Hydrocarbon SmartSystem®

Real-Time Refinery Process Analysis

Superior Reliability

Precise

High Performance

- An on-line real-time process analysis system
- Rugged vibration-resistant optical bench
- Improves plant efficiency
- Enhanced user-friendly operator interface
- Increase production and reliability

Hydrocarbon SmartSystem

NextGen Process FTIR Monitoring

Hydrocarbon SmartSystem® (HSS) analyzer is an on-line system that provides real-time, accurate and stable monitoring of physical properties and chemical compositions for refinery process streams. The HSS utilizes patented ExxonMobil™ technology. Featuring the new platform SpectraRTS™, the HSS analyzer offers unique simple tools for sample system control, model development and DCS communications. The 15" monitor provides easy access to the user-friendly HMI.

- Integrated system includes sample temperature conditioning, water removal and filtration. Automatic features including sample outlier collection, cell wash, and sample validation
- Rugged vibration-resistant optical bench provides superior stability
- Embedded PC option with SpectraRTS™ and SpectraQuant™software provides a comprehensive analysis including outlier identification and capture, alarming functions, and detailed system diagnostics
- Full PCR/PCA chemometric capability with SpetraQuant
- Seamless connectivity with DCS and LAN systems through Modbus®, OPC®, Ethernet and other digital and analog protocols
- Global calibration database provides starter models for quick implementation
- Demonstrated uptime > 99%
- Remote access via modem or LAN

The System Advantage

- Extended Near-IR spectral range enables optimal light and heavy hydrocarbons analysis
- Analyzes up to 24 process streams
- Optional Dual and Triple Cell configuration for multi-stream analysis
- Optional heated sample system available to analyze heavy hydrocarbons

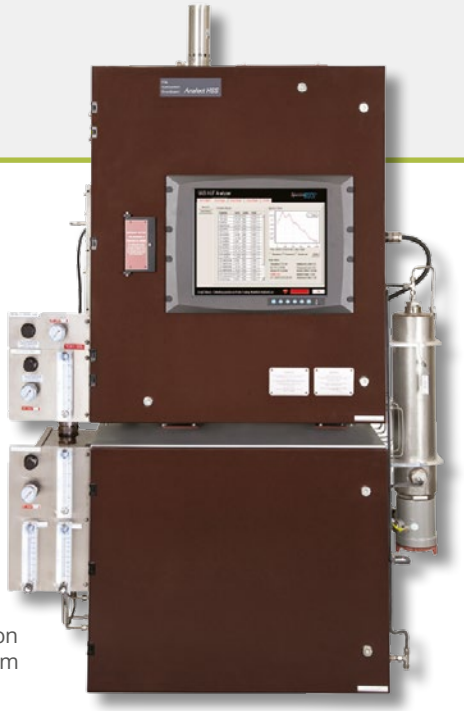
- Seamless calibration transfer between the Diamond 20™ lab system and the Hydrocarbon SmartSystem analyzer
- Rapid data collection, calibration, validation and modeling with the RefinIR™ laboratory system

Customer Benefits

- Improved plant efficiency
- Enhanced user-friendly operator interface
- Increased production and reliability

Diamond 20
lab system

RefinIR
laboratory system



Hydrocarbon
SmartSystem

Proven FTIR Applications

Gasoline Properties	Diesel Properties	Component Streams
RON, MON	Cetane Number	FCC/FCC Feed
Distillation Points	Cetane Index	Reformate
E200, E300	Cetane Additives	Alkylate
RVP	Benzene	Isomerate
Benzene	Polycyclic Aromatics	MTBE
Aromatics	Density	Straight Run Naptha
Olefins	Aromatics	Pentanes
Oxygenates	Kinematic Viscosity	Raffinate
Gravity	Distillation Points	C5/C6 Splitter
U/L Ratio	Flash point	Heavy Aromatics
Drivability Index	Gravity	Crudes

For specific property performance, we require submittal of a User Specification Form detailing process composition and conditions.

Getting Started with Our Laboratory Analyzers:

Diamond 20 and RefinIR

The Diamond 20 lab system is the companion to the Hydrocarbon SmartSystem® on-line analyzer.

SpectraQ software allows for the easy collection of calibration specta to performing routine analysis.

Calibrations developed in the laboratory on the Diamond 20 analyzer are seamlessly transferred to the on-line Hydrocarbon SmartSystem to provide real-time analysis.

Diamond 20

RefinIR

The all new RefinIR is a fully integrated laboratory auto-sampler and FTIR instrument. Designed to measure liquid hydrocarbons including gasoline, diesel and crude oils in a single auto-sampler.

The RefinIR features the Transept interferometer platform that uses the new DCM 600™ data acquisition electronics pack.

Sample Conditioning Systems

We have the expertise to design your extractive sampling system. Our turnkey system achieves optimum performance giving your analyzer consistently accurate and reliable measurements.

Our offerings include:

- Analyzer loop-thermal enclosure with temperature conditioning
- Fast loop conditioning panel
- Automated sample collection
- Automated ASTM validation and wash system

Additional customized systems can be provided:

- Sample recovery system
- Fast loop pumping system
- Stream switching

ASTM Compliant Analytical Systems

- **ASTM D6122:** Standard practice for validation of the performance of multivariate process infrared spectrometers
- **ASTM E1655:** Standard practice for infrared multivariate for quantitative analysis

Validation Skid

SpectraSuite Software Delivers Power to Your Process

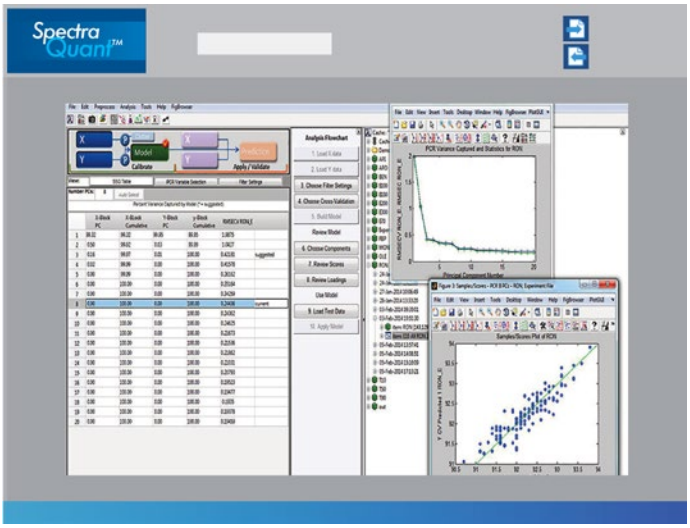
SpectraQ
SpectraQ enables the effective use of the Diamond 20 for laboratory analysis and instrument validation.

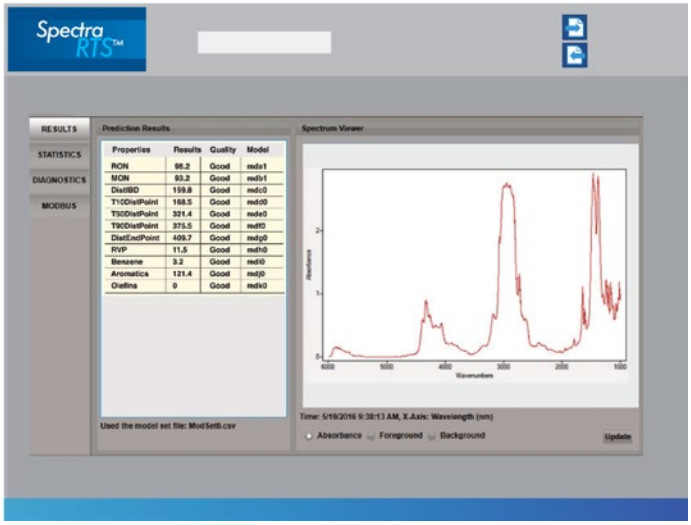
Collect calibration spectra and perform routine quantitative analysis on samples.

Designed to integrate seamlessly with our SpectraSuite™ process spectroscopy software.

Spectra Quant
SpectraQuant chemometric software is a dynamic Windows® based tool that utilizes Principal Component Analysis/Principal Component Regression (PCA/PCR).

It consolidates today's best features for modeling complex multi-components for any refining process.





SpectraRTS
SpectraRTS delivers flexible set-up and control of your system, extensive diagnostics, easy-to-use scripting and robust DCS communications.

Interactive communications allow model sets to be switched automatically when changing blend types thereby maximizing blended measurement efficiency.

Specifications:

Spectrometer
Interferometer: Transept IV™ hermetically sealed interferometer with refractively scanned design
Operating Range
7000 - 450 cm^{-1}
Detector
DTGS Pyroelectric
Analysis Time
30 - 60 sec. for multiple property predictions Ambient Environment Conditions
0 - 38°C standard ambient temperature

Sample System Design Specifications	
Sample	Light or heavy hydrocarbons (i.e. gasoline, diesel, crude)
Number of streams	Up to 3 sample cells, 24 streams
Filtration	Sample must be pre-filtered to < 5 microns < 5 microns
Pressure	2.1 - 21 kg/cm2 (30 - 300 PSIG)
Pressure drop required	21 kg/cm2 (30 PSIG)
Sample temperature	0 - 100°C (32 - 212˚F)
Flow requirements	Total: 700 ml/min (11 GPH)
Sample capture loop	500 ml/min (8 GPH)
Cell loop:	200 ml/min (3 GPH)
Wetted materials	Stainless Steel, Teflon, Kalrez (no Viton)

Area Classification
ATEX Zone 1 and 2
NFPA Class I, Division 1 and 2
NEC 505 Touch screen only available for certain classifications
Process Control Interface
Modbus,OPC and analog protocols
Fiber optic Ethernet and serial communications options

Utility Requirements - Analyzer and Cell Enclosure
Mains power 115/230 VAC 50/60Hz single phase 1500 watts max
Sample cooling water flow 1 liter/min (16 GPH)
Sample cooling water temperature 0 - 20°C (32 - 68°F)
Instrument air pressure 5.6 - 8.4kg/cm2 (80 - 120 PSIG)
Instrument air flow 700 liter/min (25CFM) at STP maximum
Instrument air dewpoint -40°C maximum
Sample recovery of 200cc/min (3 GPH) at atmospheric pressure
Validation Skid:
Nitrogen for solvent and toluene tank pressurization 4.2 - 8.4kg/cm2 (60 - 120 PSIG) very low average flow Instrument Dimensions: Optical head and sample box Environment Conditions
220 cm (h) x 97 cm (w) x 46 cm (d) (87 x 38 x 18 inches)
Weight: 270 kg (600 lb). Automated Zero, Validation and Stream Selection
High-reliability, double block-and-bleed valves. Stable Analysis Conditions
Final moisture, particulate, pressure, flow and temperature conditioning
Efficient Automated Sample Capture:
Software captures only those samples most important for the upgrade of the currently running model
Up to 4 streams, each stream has a dedicated sample capture cylinder with quick-disconnects for easy removal and replacement
Spectral data and statistics are automatically saved for each capture sample
System Validation to ASTM D 6122:
Validated automatically at regular intervals or on-demand from operator or DCS command from operator or DCS command.
Manual validation sample introduction
Validation skid with tanks for validation and wash solvents

For heavy hydrocarbons, the sample cabinet can be heated up to 100°C.

Experience

Our staff of applications experts provide feasibility and calibration services that set the worldwide standard. We also provide system integration and post-installation support to ensure your success. we offer annual hardware maintenance and calibration modeling service support contracts.

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GAIN REAL-TIME INSIGHT INTO YOUR PROCESS

Process Insights manufactures and delivers premium sensors, monitors, detectors, analyzers, instrumentation, and software that are mission-critical to keep your operations, personnel, and the environment safe – every day across the globe.

Get the most reliable, precision analytical technologies available on the market today. We will work to match your needs and budget, and provide the optimal, and most stable process analysis solution for your application.

CENTERS OF EXCELLENCE | PROVIDING PROVEN SOLUTIONS

Process Insights is committed to solving our customers' most complex analytical, process, and measurement challenges everyday.

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