Real-Time, Accurate Stable Refinery Process Analysis

ANALECT®
Hydrocarbon SmartSystem®

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ANALECT® Hydrocarbon SmartSystem®

NextGen Process FTIR Monitoring

ANALECT® 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 flagship 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.

Spectra RTS

Key Features:

- 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 SptraQuant™
- 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 ANALECT 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 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 ANALECT RefinIR™ laboratory system

Customer Benefits

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

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Proven ANALECT® 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, Schneider Electric requires submittal of a User Specification Form detailing process composition and conditions.

Getting Started with Laboratory Analyzers, The ANALECT® Diamond 20™ & RefinIR™

The ANALECT 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.
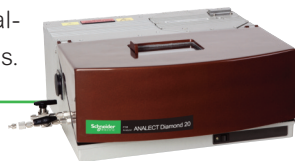
The all new ANALECT® RefinIR™ is a fully integrated laboratory autosampler and FTIR instrument. It is designed to measure liquid hydrocarbons including gasoline, diesel and crude oils in a single autosampler. The RefinIR features the ANALECT Transept™ interferometer platform that uses the new DCM 600™ data acquisition electronics pack.

ANALECT Diamond 20

ANALECT RefinIR

Sample Conditioning Systems

AIT has the expertise to design your extractive sampling system. Our turn-key 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 quantitive analysis

Validation Skid

# SpectraSuite Software Delivers Power to Your Process

SpectraQ™

SpectraQ™ enables the effective use of the ANALECT Diamond 20 for laboratory analysis and instrument validation. Collect calibration spectra and perform routine quantitative analysis on samples. It is unique in the fact that it's designed to integrate seamlessly with AIT's SpectraSuite™ process spectroscopy software.
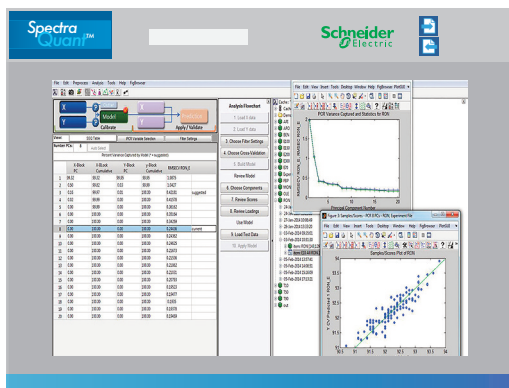
Spectra Quant™

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.
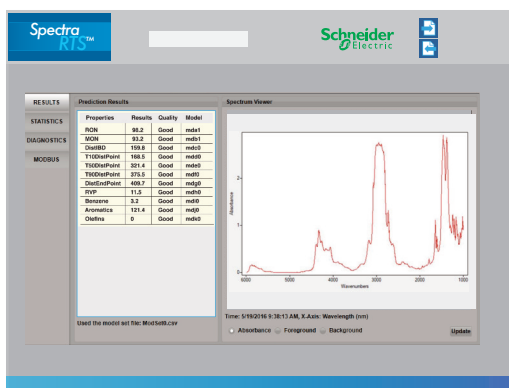
SpectraRTS™

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 efficency.

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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
- Pressure: — 2.1 - 21 kg/cm^2 (30 - 300 PSIG)
- Pressure drop required: — 21 kg/cm^2 (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.
- 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.
- 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. Schneider Electric offers annual hardware maintenance and calibration modeling service support contracts.

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