ANALECT®FTIR Refinery Analyzer

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 AIT's new flagship operating platform ***SpectraRTS,™*** *the HSS analyzer which offers unique simple tools for sample system control, model development and DCS communications. The 15" monitor provides easy access to the new user-friendly HMI.*

ANALECT Hydrocarbon SmartSystem

The ANALECT®System Advantage

- *Extended Near-IR spectral range allows 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™ lab system*
- *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 SpectraQuant™*
- *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*

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ANALECT®FTIR
Hydrocarbon SmartSystem®

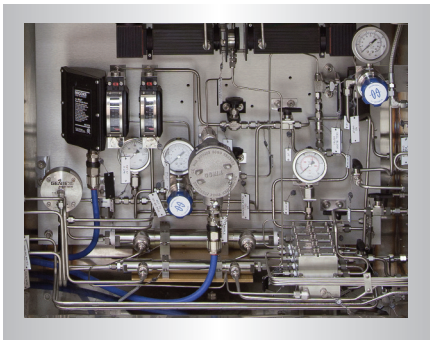
AIT Customers Include

BP
Eni Agip
ExxonMobil
Gazprom Neft
Kyokuto
Mozyr Refinery
Nansei
OMV AG
Petrom SA
Phillips 66
SAMREF
Saras
Saudi Aramco
Staatsoile
Takreer
Tonen General
Tupras
Valero

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, AIT requires submittal of a User Specification Form detailing process composition and conditions.



Analyzer loop thermal enclosure with sample conditioning & stream switching

Automated sample collection system

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. Experience you can count on!

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 that 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 practices for infrared multivariate for quantitive analysis*

Validation Skid

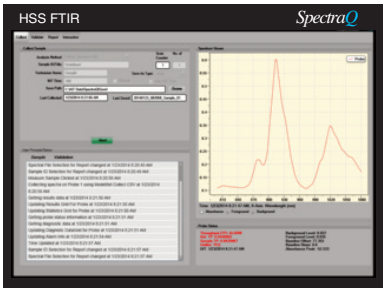
Getting Started with the ANALECT Diamond 20™ Laboratory Analyzer

*The **ANALECT Diamond 20**™ laboratory system is the companion to the ANALECT HSS on-line analyzer. SpectraQ software allows for easy collection of calibration spectra and performing routine analysis. Calibrations developed in the lab on the Diamond 20 analyzer can then be seamlessly transferred to the Hydrocarbon SmartSystem on-line analyzer to provide real-time analysis.*

ANALECT Diamond 20

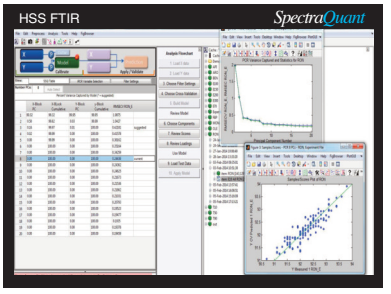
ANALECT™
Transference Protocol

- *Assures that any one ANALECT analyzer provides measurements identical to any other ANALECT analyzer*
- *Provides seamless calibration transferability between ANALECT analyzer systems*
- *Reduce maintenance downtime – no need for calibration updates during source & other optical component changes*

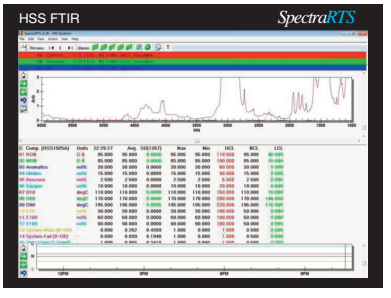


SpectraSuite™ Power Drives the Process

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.*



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™ *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.*

Applied Instrument Technologies
by Schneider Electric

ANALECT®FTIR
Hydrocarbon SmartSystem®

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

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 you feasibility and calibration services that set the worldwide standard. We also provide system integration and post-installation support to ensure your success.

Contact Us:
AIT offers annual hardware maintenance and calibration modeling service support contracts.

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