# Thermo Scientific Antaris II FT-NIR Analyzers

## Bridging the gap between method development and analyzer deployment

The Thermo Scientific™ Antaris™ II is a reliable FT-NIR analyzer that solves a broad range of industrial manufacturing quality control problems by providing timely measurements in the laboratory, at production point-of-use, or in real-time processes.










The Thermo Scientific Antaris II Fourier Transform Near-Infrared (FT-NIR) spectrometer is a dedicated analyzer designed specifically for use in the industrial environments of the pharmaceutical, food and beverage, chemical and polymer industries.

FT-NIR provides several clear advantages over dispersive NIR techniques:

- Fast – all frequencies are measured simultaneously
- Mechanical simplicity for improved reliability – the moving mirror is the only continuously moving part
- Internally calibrated for better accuracy and precision – based on the HeNe laser as an internal wavelength calibration standard
- High spectral resolution – resolution is determined by the stroke length of the moving mirror, so there is no degradation to optical throughput or system sensitivity
- Fewer standards and less complex methods are required due to superior resolution, precision and accuracy of FT-NIR data; methods are more robust and easier to develop

### The New Standard for Design

The Antaris FT-NIR analyzer defines the new standard for the design and manufacture of full-range, near infrared analyzers including:

- High performance combined with rugged design
- Reproducible, regardless of configuration, user, or environment
- Regulatory traceability incorporated into every element of design from the ground up
- Suitable platform for each point in the NIR lifecycle, facilitating method development, deployment, transfer, and routine operation

### System Advantages

- Internal, automatic background handling (no background collection necessary)
- Sample technique switching without changing analyzer configuration
- Dynamically aligned interferometer provides excellent reproducibility
- Factory-aligned, pinned-in-place components for long-term stability
- User-replaceable parts that maintain calibration performance
- Indicator panel to communicate pass/fail/prompt information in a routine setting
- Compliant, workflow-based operation that is easy to administer and control
- Heavy-duty casting for non-lab duty
- Alignment-free, user-replaceable components for hassle-free maintenance
- High sample throughput
- High reliability
- Thermo Scientific™ OMNIC™ software for spectroscopic and method development work
- Thermo Scientific™ RESULT™ workflow-based software for push button routine analysis

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# Antaris II System Specifications

| | |
|---|---|
| Detection | High-sensitivity, high-stability matched InGaAs |
| Interferometer | Proven frictionless, stable, long-life Michelson |
| Instrument Dimensions | 40.6 cm (width) × 68.5 cm (depth) × 33 cm (height) |
| Weight | 47.7 kg |
| Source | Long-life, high intensity halogen NIR source; spare source included with system, guaranteed filament image alignment |
| System Status Indicators | Indicator lights report scan, laser, power, and source status continuously |
| Operator Communication Indicators | Red, yellow and green LED indicators communicate pass/fail/prompt |
| Sealed and Desiccated | Yes |
| Purge | Optional |
| Operating Temperature Range | 15–35 °C |
| Power Requirements | 90–264 VAC |
| Integrated Computing | Optional |
| Communications | Plug and Play USB communications to PC, no addressing or administration required |
| Network and Control System Communications | Direct PC to Ethernet allows file system and OPC communications |
| Regulatory Approvals | CE |

**System Performance**

| | |
|---|---|
| Spectral Range | 12000–3800 $cm^{-1}$ (833–2630 nm) |
| Resolution | 4 $cm^{-1}$ across spectral range (.6 nm at 1250 nm); 2 $cm^{-1}$ option across spectral range (.3 nm at 1250 nm) |
| Wavenumber Reproducibility (system to system) | Better than .05 $cm^{-1}$ (.008 nm at 1250 nm) |
| Wavenumber Repeatability (single system) | 10 measurement standard deviation <.006 $cm^{-1}$ |
| Wavenumber Accuracy | ±0.03 $cm^{-1}$ (.005 nm at 1250 nm) |
| Photometric Linearity (USP) | Slope 1.0 ± 0.05 and an intercept of 0.0 ± 0.05 |

## Antaris II Method Development Sampling (MDS) System

When you have to solve an analytical problem related to your products, selecting the correct sampling tool is crucial. The Antaris II MDS system provides a simple solution. It contains all the tools you need to analyze solids, liquids, powders, pastes and tablets. The MDS is ideal for method development as it allows you to choose the best sampling technique for the target end-use environment. It offers everything you need to run any sample, without reconfiguring the analyzer or changing accessories:

- Integrating sphere module for diffuse reflectance sampling
- Automated transmission sampling
- Fiber optic sampling with the Thermo Scientific™ SabIR™ probe
- Optional Tablet Analyzer module




## Antaris II Dedicated Analyzers

In addition to the MDS, the Antaris II can also be configured with any single or combination of sampling modules you choose, creating a dedicated workhorse analyzer for method development with limited sample types or for routine use in an operations context. Beampaths are matched to those from the MDS system, regardless of configuration. Choose from any combination of integrating sphere, transmission, and fiber optic sampling. The tablet transmission module is available for systems configured with the integrating sphere.



Liquid Transmission Module



Integrating Sphere Module



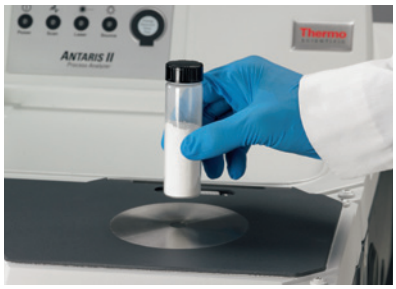
Transmission Card Module with 5 cm Sample Cup Spinner on Integrating Sphere



Tablet Analyzer Module

## Solid Sampling

The Antaris II Integrating Sphere is ideal for measuring solids and powders quickly and reproducibly by diffuse reflectance. It works well for a variety of materials including food ingredients, polymer pellets, or powdered chemicals in vials or bottles. The high efficiency of the Antaris II sphere design results in increased sensitivity, more robust calibrations and greater sample-to-sample repeatability.




| Integrating Sphere Module | |
|---|---|
| Optical | Lens and baffle-free |
| | Optically matched sphere/window ratio |
| Image Size | Optimized for sensitivity for all sample types and true simultaneous tablet reflection and transmission sampling (when used with tablet detector) |
| Detection | High sensitivity InGaAs, offset for baffle-free design |
| Background | Automatic and internal with samples in place; no operator intervention required |
| Integrating Sphere | High throughput Integrating Sphere with greater than 95% collection efficiency at collecting scattered energy |
| Sampling Window | Chemically resistant sapphire |
| Remote Start Capabilities | Analyzer panel button |
| Sampling | Multiple size sampling cups available |
| | VLS (Viscous Liquid Sampler) cleaning-free quantitative analysis of pastes, gels, and syrups |
| | Universal tablet holder and customizable tablet holders |
| Automation | Autosampler RS provides fully automated tablet and vial sampling |
| | Multiple sample cup spinners available for repeatable averaging of heterogeneous samples |

## Tablet Analysis

The Antaris II Tablet Analyzer module combines the Antaris Integrating Sphere module with a highly sensitive transmission system. This combination allows tablets and many other solid materials of all shapes and sizes to be analyzed by both reflectance and transmission simultaneously in true dual channel mode without moving the sample or reconfiguring the optics of the system.



| Tablet Analyzer Module* | |
|---|---|
| Optical | Detection system allows reflection and transmission sampling at one sample position |
| | Lens-free optical arrangement minimizes stray light/non-sample signal, spot size optimized for solid dosage forms; patented detection system |
| | Sample-detector distance optimized for tablet contact sensitivity |
| | True *simultaneous* transmission and reflection sampling: reflection and transmission analysis completed in less than half the time of other systems |
| Standard Transmission Module | Narrow band, ultra high-sensitivity InGaAs detector for opaque tablets; Spectral range: 12000–5880 $cm^{-1}$ (833–1700 nm) |
| SoftGel Tablet Transmission Module | Broad band, high-sensitivity InGaAs detector for gelcaps and tablets; Spectral range: 12000–3800 $cm^{-1}$ (833–2630 nm) |
| Remote Start Capabilities | Analyzer panel button |
| Operator Communication Indicators | Red, yellow and green LED indicators on probe communicate pass/fail/prompt |
| Mechanical | Repeatable optical axis positioning of detection system |
| Automation | MultiPro Autosampler allows tablet autosampling with simultaneous transmission and reflection analysis |

## Automated Sampling

Automated sampling provides efficient, computer-controlled, non-destructive quality-control analysis with no additional space, power or external cables. The Thermo Scientific MultiPro Autosampler* automates the analysis of tablets and softgels utilizing both diffuse reflectance and transmission techniques. The Thermo Scientific Autosampler RS* automates reflection sampling of powders in vials. Dependent on tablet or vial size, up to 30 tablets or 60 vials can be analyzed in one workflow.




MultiPro Autosampler

Autosampler RS

** Must be used in conjunction with the Integrating Sphere module*

## Liquid Sampling

Designed for quality control testing of raw materials, chemicals, polymers, surfactants and formulations, the transmission module provides quick analysis of liquid samples in standard-sized cuvettes, culture tubes and card holders.





**Transmission Module**

| | |
|---|---|
| Automated Sample Positioning | Computer controlled |
| | Two sample positions plus background |
| | Automatic reference material background position |
| Background Handling | Automatic and internal with samples in place; no operator intervention required |
| Operating Temperature Range (Ambient Sample Holders) | 15–35 °C |
| Transmission Card Holder | Three-position slide holder for 5 cm × 7.6 cm transmission cards or accessories |
| Transmission Cuvette Holder | Three-position cuvette holder for 0.5–10.0 mm cuvettes |
| Heated Transmission Cuvette Holder | Temperature-controlled, three-position cuvette holder for 0.5–10.0 mm cuvettes, ambient–100 °C |

## Fiber Optic Sampling

Near infrared sampling by fiber optics allows rapid point-of-use QC for raw material identification, quality measurements and sample component analysis. The Antaris II Fiber Optic module can be used with the SabIR hand-held diffuse reflectance probe which can analyze samples directly or indirectly through packaging materials. With industry standard SMA connectors, the Antaris II fiber optic module can integrate with third party probes to provide a wide range of sampling options. Methods can be transferred to the Antaris MX process analyzer line for optimized at-line material testing or online analysis via fiber optic probes.

**Fiber Optic Module Specifications**

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|---|---|
| Spectral Range | Range is dependent on fiber type and length of probe used |
| Fiber Optic Connection | Standard SMA connection, allowing many probe sampling options |

**SabIR Fiber Optic Probe Specifications**

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|---|---|
| Spectral Range of SabIR Probe | 12000–4000 $cm^{-1}$ (833–2500 nm) |
| Probe Shaft | Stainless steel shaft 15.8 cm (length) × 1.6 cm (diameter) |
| Fiber Optic Cable | High throughput low OH silica fiber bundle – two or three meter length |
| Window Material | High quality, chemical-resistant sapphire |
| Probe Weight | 0.7 kg |
| Operating Temperature Range | 15–35 °C |
| Remote Start Capabilities | Handheld trigger |
| Background Handling | Automatic background in holster also available |
| Operator communication indicators | Red, yellow and green LED indicators on probe communicate pass/fail/prompt |
| Probe Holder | Holder with built-in Spectralon® reference |
| Fiber Optic Connection | Standard SMA connection |
| Rapid Liquid/Solid switching | Optional transflectance sleeves allow fixed or multiple pathlength settings, avoids primary probe window contamination |





The Antaris MX process analyzers provide a smaller footprint and are ideal for at-line, fiber-optic sampling using methods developed on Antaris II analyzers.



# Comprehensive Software

The Antaris systems offer the broadest software flexibility available. From the method developer or chemometrician to routine operator or automated process operation, the Antaris software line matches the unique needs of each point in the analyzer life cycle.

The Antaris systems are available with the following packages:

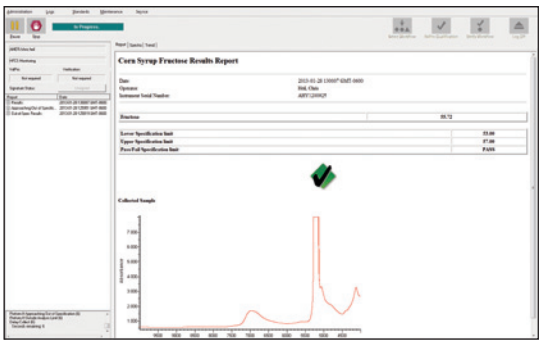
- RESULT software* suite for workflow development, deployment and operation
- Thermo Scientific™ TQ Analyst™ software for predictive method development
- OMNIC spectroscopy software for spectral data manipulation and analysis
- Camo's The Unscrambler® software for investigative and exploratory chemometrics

** RESULT workflows can be used with methods from TQ Analyst, Thermo Scientific™ GRAMS™ PLS/IQ models and Camo's The Unscrambler software.*

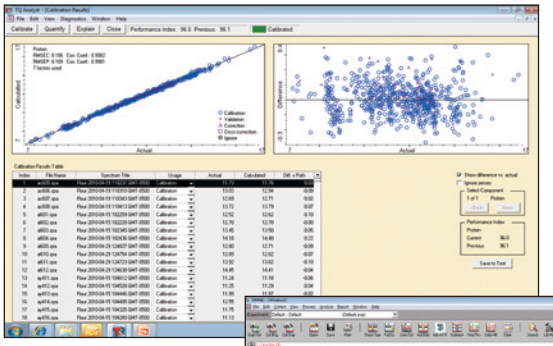
## Integrated Computing and Data Connectivity

The system is available with integrated computing and wireless communications. Whether your testing is performed in an open goods-in area or in a safe laminar flow area, this system provides maximum utility and mobility and minimizes material movement in your process. The system is also compatible with barcode and RFID systems for integration with LIMS and manufacturing systems.

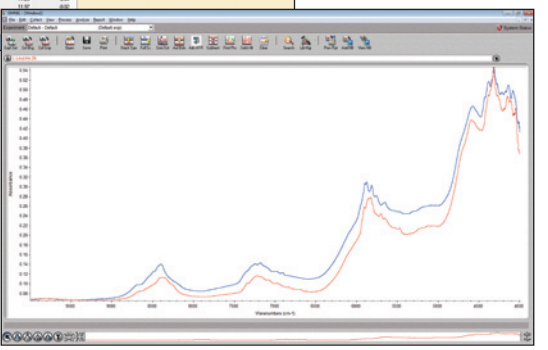




RESULT Integration and Operation make workflow development and deployment worry-free and fit for purpose



TQ Analyst software provides an easy approach to creating powerful predictive calibrations



OMNIC software provides the best tools available for spectral analysis

## Qualification and Regulatory Compliance

The Antaris II FT-NIR analyzer uses the Thermo Scientific™ ValPro™ system qualification package.

This package includes:

- DQ, IQ, OQ, PQ documentation
- Real-time USP-based qualification and performance testing while all channels are online
- Internal validation wheel with NIST-traceable, calibrated and serialized standards
- Qualification services by certified engineers
- Tools to achieve 21 CFR Part 11 compliance



# About the Antaris Line of Analyzers



Solving industrial analytical challenges requires bringing the right tools to the job. The cumulative years of reliable spectroscopic technology from Thermo Fisher Scientific have been combined with the knowledge of experts and everyday users in industry to produce a range of analyzers that set a new standard in task suitability. We are pleased to offer a full line of analyzers with common platform elements in software, validation tools, methodology, support, and implementation. The Antaris product line represents an industry-driven migration of spectroscopy from science to industry, in a solution that connects the lab and the plant for the first time.

## Our Pledge of Support: A Fundamental Analyzer Requirement

The Antaris analyzer product family is backed by our worldwide applications and process support team. With dedicated support for most countries and regions around the world, our customer support organization is the best in the industry. We provide:

- Applications Assistance
- Qualification Support
- Preventive Maintenance
- 24/7 Services

We offer a full suite of product and customer services tailored to near-infrared and process analysis. Let us recommend a support configuration, or ask us how we can customize these services specifically to your requirements:

### 1 Feasibility and Site Survey

We will work with you to evaluate the feasibility of near-infrared as a solution to your process analytical challenge. A Thermo Scientific NIR specialist will visit your intended use site to gather key information related to process analyzer integration and the necessary components, services, and preparations. We will provide a thorough proposal to ensure a smooth implementation.

### 2 Installation

Our certified field-service engineers ensure proper installation and operation of the analyzer. Prior to installation, we provide a site-readiness form to synchronize installation preparedness between your site and our engineers.

### 3 Qualification Services

We offer a full line of installation and operation qualification services and annual requalification services, which can be used in conjunction with the ValPro system, to demonstrate proper performance and suitability.

### 4 Training

Our team of Antaris support specialists can provide:

- On-site or factory-based training on the use of the system
- Customized training to ready your staff or plant
- Service training and certification to your plant personnel

### 5 Method Development Services

If you do not have the time or resources to model your process parameters using near-infrared, let us provide calibration services for you:

- Method Development
- Maintenance
- Transfer Services

### 6 Repair and Technical Support Services

From depot repair to critical support, we offer repair and technical support services that include 24/7 options to help meet the uptime requirements of your application.

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