

## MPA II

- The new Multi Purpose Analyzer

## MPA II. NIR in a new light.



The MPA II is the result of more than 40 years of experience in the engineering and production of FTIR and FT-NIR spectrometers. It is a powerful tool for developing sophisticated calibration methods for your laboratory or process needs, yet an easy to use QA/QC instrument for routine work. With its modular technology, it can be configured individually for each analytical task.

## ● **MPA II** Multi Purpose Analyzer

### **Unrivalled Flexibility**

Choosing the best possible sampling method is crucial when solving a specific analysis task. With the MPA II, you have a complete solution at hand for your daily QA/QC work, but also for sophisticated method development studies.

Initially it is often not obvious which sampling method is the best. With the MPA II, simply try out several methods choose the best option for you.

- Liquid samples can be measured in the sample compartment using disposable vials or cuvettes, but also directly in their container using fiberoptic probes.
- Compare the composition of pharmaceutical or chemical substances in bulk form with the fiber optic probes or fill them in vials and use the integrating sphere.
- Test your food products, solid or semi-solid, with the integrating sphere.
- Analyze the manufactured tablets using the external transmission unit and sample wheel.

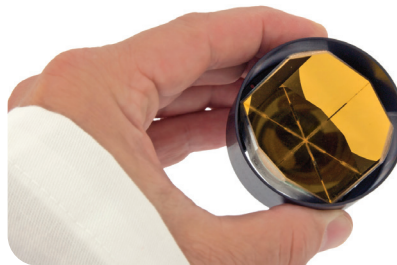
The possibilities are endless, and due to the modular design of the MPA II, the instrument can easily be adapted to your needs. The robustness of the instrument allows it to be used in the laboratory and factory floor. It can even be placed on a utility cart for mobile applications.

### **State-of-the-Art Technology**

The MPA II incorporates state-of-the-art optical parts for outstanding performance and stability:

- Long-life light source for enhanced robustness and reduced maintenance costs.
- Durable solid state laser for highest wavenumber accuracy.
- Permanently aligned RockSolid™ interferometer, equipped with gold-coated cube-corner mirrors for consistent high quality results, less downtime and highest stability.
- High-sensitivity InGaAs detectors with linear response over the complete wavenumber range for highest accuracy and reproducibility.

All optical components installed in the MPA II are permanently monitored by the online diagnostic system, which makes sure that your spectrometer operates correctly. Whenever a component is out of specification, the user is notified immediately.



The MPA II utilizes retro-reflecting cube-corner mirrors for optimum performance.



Standard ethernet connection allows communication protocol and network access for the MPA II.

### **Hassle-Free Maintenance**

MPA II spectrometers are designed to be easily maintained by the user, thereby decreasing downtime and maintenance costs. Consumable items such as the laser and the light source are designed for a long life, but if they need to be replaced, the system automatically informs the user of the failure and offers online help for the replacement procedure. The consumables are prealigned and can be easily and quickly changed.

Moreover, the Ethernet access to the MPA II allows remote control and diagnostics of the spectrometer via your intranet or the World Wide Web.

### **10-year Warranty**

We are convinced of the exceptional quality by design of our MPA II FT-NIR spectrometers. This is why we grant 10 years warranty on the moving parts of the interferometer as well as on the solid state laser.

## Easy Operation

Customizable workspaces as well as easy measurement modes which guide you through the setup of analytical methods are standard in the OPUS spectroscopy software. Measurements can be started with a mouse click or at the touch of a button.

The smart display informs the user about the instrument status and the measurement. These factors make the operation of the instrument and the software so easy that even untrained personnel can operate the MPA II spectrometer from day one.



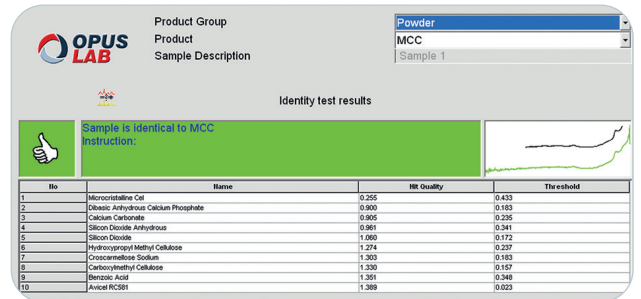
# MPA II Multi Purpose Analyzer

## User-friendly Software

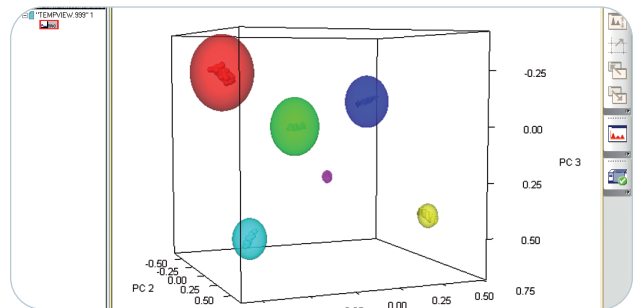
OPUS is an easy-to-use, but powerful, all-in-one spectroscopy software. It includes the most comprehensive collection of data acquisition, processing, and evaluation functions and can be completely configured to meet your needs. With extended user settings and management features, the access rights in OPUS are completely customizable.

Additional OPUS packages for routine measurements and evaluations can be added as required:

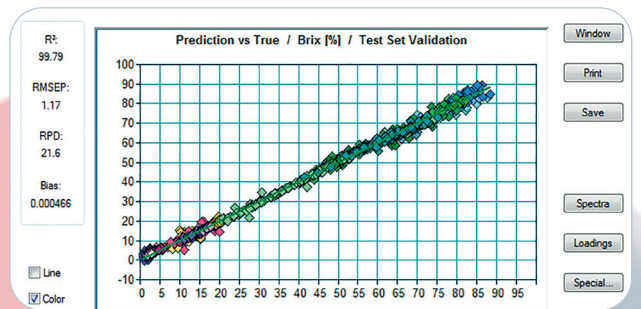
- OPUS/LAB is an intuitive and easy-to-use software interface for conducting routine analysis tasks. It can be used by untrained personnel from the production line as well as by your experienced laboratory staff. The software guides you through the workflow from the measurement to the evaluation result and report. OPUS/NIRLAB combines OPUS/LAB with qualitative and quantitative evaluation routines.
- OPUS/IDENT offers reliable identification of all raw materials with one hierarchical library. Method setup including statistical evaluation, internal validation and use of the identification library, can be performed in a few easy steps.
- OPUS/CONFO determines the conformity of a given material by looking at the spectral variation between different lots of materials which have been determined acceptable for the manufacturing process and an unknown sample at each spectral data point.
- The OPUS/QUANT2 software for multivariate calibration and validation is based on the common algorithm PLS (Partial Least Squares). The setup includes many useful plots, statistics and tools making your method development less time consuming, e.g. automatic test set selection, removing of redundant samples and an automated optimization tool to find the parameters for the potentially best model.
- The ONET software is a web based application to setup, administrate and control a network of FT-NIR instruments from anywhere in the world. All data measured locally on the spectrometers are pooled and centrally stored. Nevertheless, all required files and data are still available locally ensuring the analysis of samples at any time even when the network is temporarily unavailable. With ONET, measurement procedures and calibrations of all instruments can be easily harmonized which in turn reduces the need for local expertise and training.



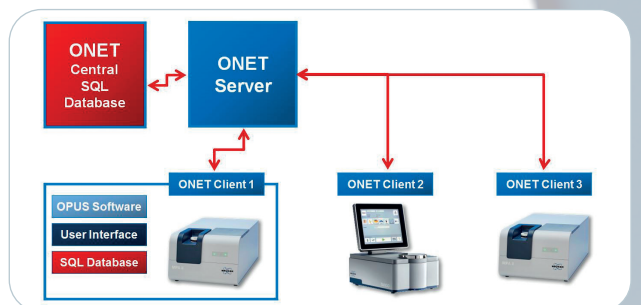
The user-friendly OPUS/LAB software is ideal for the daily routine analysis, even by untrained personnel.



OPUS/IDENT is a powerful software package for the identification of substances, using hierarchical libraries.

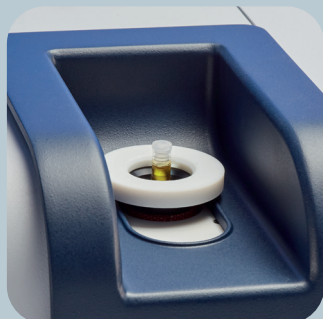


OPUS/QUANT an easy-to-use software for the quantitative analysis of complex mixtures with automated method optimization.



ONET Software architecture consisting a central database, application server and local client spectrometers.

# • MPA II Multi Purpose Analyzer



**Sample Compartment, with optional sample heater and automated background capability, allows easy measurements of liquids in cuvettes or disposable vials without having to open drawers.**

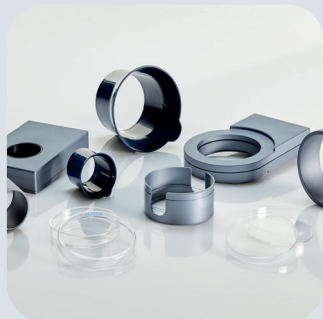


A wide range of vials and cuvettes are available for measurements of liquid samples in transmission. Larger vials are also available for analyzing solids in reflection on the integrating sphere.



Various types of high quality quartz flow cells, including temperature controlled options are available for the automated measurement of liquid samples like milk, juices or soy sauce.

**The MPA II brings flexibility to your laboratory. Optional extension modules are available for a wide range of samples and applications.**



When measuring heterogeneous samples, the use of sample rotators significantly increases the accuracy of the results. Bruker Optics offers a wide range of accessories, including adaptors for glass and polystyrene Petri dishes.



**Integrating Sphere for measuring solids and semi-solids in diffuse reflection. An optional sample rotator assures a high reproducibility for heterogeneous samples.**



For the measurement of small samples like single seeds in reflection, a set of accessories is available which is manufactured to the size and shape of your sample.

Handheld fiber optic probes are ideal for analyzing solid materials in the laboratory or the incoming raw materials control area. Reflection probes are available in different lengths and can be used for various sizes of containers, including big-packs.



**Fiber Optic Probes for measuring samples directly in containers, e.g. in the warehouse. Up to two different probes can be connected for solids and liquids.**



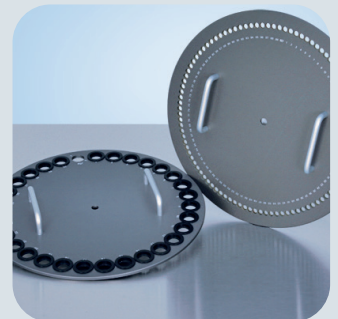
## Our FT-NIR spectroscopy: available for various sample types



For measurements of liquid samples, the fiber optic transmission probes are ideal. Depending on the type of sample to be analyzed, the probes can be manufactured in various path lengths.



The use of automated sample wheels dramatically increases the throughput and effectiveness by measuring up to 99 samples unattended. Customized samples wheels are available.



When measuring tablets, a well-fitting tablet holder is required to increase the accuracy and reproducibility of the measurements. Bruker Optics manufactures customized tablet holders for all shapes and sizes according to your needs.



**Transmission Unit with optional sample wheel, e.g. for the automated analysis of vials or solid samples such as tablets in transmission and vials in reflection.**



## OVP - PQ Test Protocol



Company: Bruker Optik GmbH  
Operator: Admin  
Instrument Type: MPA II Sphere  
Optics Configuration: Sphere Background with: NIR, Quartz, TE-InGaAs (Internal Pos. 1)  
Accessory: Integrating Sphere Unit  
Instrument Serial Number: 00103  
Instrument Firmware Version: 2.485 Jul 15 20173  
OPUS/DB Version: OPUS 8.0 Build: 8, 0, 18 / DB: 8,0,18,424  
Overall Test Result: PASSED  
Test expires: 2/7/2018, 1:10:44 PM (GMT+2)  
Test Date/Time: 1/31/2018, 1:10:44 PM (GMT+2)  
Test Spectra Path: \*MPA\_II\_00103\validationData\20180131\1131044  
Date of last PQ Reference  
Measurement: 1/15/2018  
Comment:

Signal to Noise Test			
Minimum S/N(area 1):	500	Measured S/N:	2504
100% Line Test			
Maximum 100% Line Deviation:	0.5	Measured 100% Line Deviation:	0.28
Interferogram Peak Test			
Minimum Amplitude[%] :	70	Measured Amplitude[%]:	109.8
Energy Test			
Maximum allowed Value:	30	Measured Value:	9.5
Wavenumber Accuracy Test - BRM 2065 (36.8 Deg. C, Peak is I. corr.)			
Sample Material:	BRM 2065		
Specified Peak:	10245.60 cm-1	Maximum Deviation:	0.60 cm-1
Measured Peak:	10245.90 cm-1		
Corrected Peak:	10245.67 cm-1	Measured Deviation:	0.07 cm-1
Photometric Reproducibility Test - Glass Filter A			
Maximum Deviation[%]:	0.8	Measured Deviation[%]:	0.02

**Overall Test Result = PASSED**



Date and Signature

Date and Signature



# • Validation

## Instrument Qualification

The MPA II FT-NIR spectrometer features an internal filter wheel ('validation unit') that houses reference materials (e.g. BRM 2065) and several filters for automated instrument qualification tests. The OPUS Validation Program (OVP) is an intuitive user interface to setup and perform OQ and PQ protocols that verify that the MPA II is operating within specifications – also in routine use. A wide range of external reference materials, e.g. SRM 1920, SRM 2065 and Labsphere standards, is supported. OVP fulfils the requirements of current guidelines, e.g. USP and Ph. Eur., and always keeps the user updated on the instrument status.

## Full cGMP and 21 CFR Part 11 compliance

As a single platform interface, OPUS spectroscopy software entirely complies with current practice guidelines, featuring an extensive user management with multiple customizable access levels, complete audit trail, password protected databases and a single file strategy for easy data archiving. In 'validated mode' all demands of 21 CFR Part 11 (Electronic Records, Electronic Signatures) are covered by a smart signature strategy for measurement files and evaluation methods.

## Certification and Documentation

Bruker Optics is ISO 9001:2008 certified, continuously successfully audited and regarded as an approved hardware and software supplier by a multitude of pharmaceutical corporations. Bruker service engineers are specifically trained and certified. The 'Validation Manual' provides the comprehensive documentation of instrument qualification and software validation including the corresponding certificates.



Bruker validation manual: the comprehensive documentation for system qualification and validation.



Set of Labsphere reference standards for photometric linearity test (according to USP <856> and Ph. Eur. 2.2.40).



# • Applications

The main benefit of FT-NIR spectroscopy is its versatility and ease of use. It is a fast and precise tool for the non-destructive analysis of liquid, solid and semi-solid materials, saving costs by reducing time and reagent use.

It has largely replaced a number of wet chemical analysis methods in all types of industries including the food and feed industry as well as the chemical and pharmaceutical industry.



## Food and Feed Industry

The major application areas in the food and feed industry include edible oils, dairy and meat, beverages, bakery ingredients and condiments as well as grains, seeds, feed and forage. Here, parameters like protein, fat, starch, moisture or dry matter can be analyzed as well as more specific parameters, depending on the application.

With the MPA II integrating sphere, even heterogeneous materials can be analyzed without sample preparation in diffuse reflection. The use of easy-to-clean sample cups, beakers or Petri dishes enable an efficient sample throughput at low cost.

The sample compartment is ideal for all sorts of liquid samples like edible oils, milk, cream and beverages. The standard temperature control helps to achieve reliable and reproducible results.

The MPA II is a complete solution for your quality control needs in the food industry. The identification and qualification of your raw materials and the quantitative analysis of intermediate and finished products can be performed in a matter of seconds to ensure the highest product quality and consumer safety.

## Chemical Industry

For many years NIR technology has been used in a wide variety of chemical processes. The high information content in NIR spectra, measured in only a few seconds, allows the simultaneous analysis of many different components and system parameters with high precision.

Some of the many applications include:

- Chemistry: hydroxyl value, acid number, saponification value, iodine value, moisture content, homogeneity, ...
- Petrochemistry: octane- and cetane number, distillation-, flash-and cloud point, aromatic content, PIONA analysis, ...
- Polymer chemistry: density, viscosity, cross-link density, end group analysis, stabilizer or monomer content, ...
- Paper industry: cellulose content, fillers, glues and wet strength resins, silicon content, grammage, degree of wet expansion, ...

The content of highly complex mixtures can be determined simultaneously. It does not matter if the samples are solid or liquid and sample preparation is not necessary. The MPA II allows the non-destructive analysis at the push of a button. Hence, it is an ideal tool to meet the requirements of the modern quality control laboratories.





## Pharmaceutical and Cosmetics Industry

The first step in the manufacturing of any pharmaceutical product is the identification and validation of the incoming raw materials. Impurities and adulterants in starting materials pose potential health threats when present in the manufacturing of pharmaceutical APIs and drug products. These same impurities and adulterants may also result in lower production yields and greater needs for product purification.

## Calibration Transfer

As an exhaustive method development may be both time and resource intensive, the main prerequisite of the instrument is the transferability of the calibration methods to other instruments. This can only be guaranteed if the highest precision, stability and sensitivity are combined, as they are in the MPA II.

Changing optical components or even the complete instrument does not effect the validity of the calibration. A calibration transfer to other Bruker FT-NIR spectrometers is always possible without any additional manipulation or standardization of the spectra.

Methods created with the MPA II can therefore not only be employed on other laboratory spectrometers but also on Bruker FT-NIR process instruments. The step from the laboratory to the production line has never been easier.

The MPA II with fiber optic probes is a standard method of accomplishing the crucial material validation, providing unprecedented speed and flexibility for identification of both solid materials and liquids.

Tablets can be tested for content uniformity, residual moisture and levels of excipient. This can be performed on individual tablets and by using automated sample wheels, the throughput can be dramatically increased. Due to its exceptional light throughput, even tablets with a low active ingredient content can be analyzed with the MPA II. The speed and precision of this analytical method can aid health authorities in their fight to protect the public from the increasing trade in counterfeit pharmaceuticals.

The analysis of creams, ointments and pastes is carried out using the integrating sphere. The large measurement spot enables an examination of heterogeneous material. Easy-to-clean sample cups or alternatively disposable Petri dishes can be used for ease of handling.



# • Service and Support

Bruker Optics is staffed by expert scientists and engineers that have an in-depth knowledge of instrumentation and applications. Our world-wide FT-NIR experts will advise you in the selection and use of sampling accessories, choice of optical modules and software operation. Moreover, we are available to assist you with method development either remotely or in your lab and offer customized instruction and support packages to fit your needs.

Bruker Optics spectrometers are designed to provide years of dependable trouble-free operation, but should a problem occur a network of Bruker companies and representatives throughout the world are ready to promptly respond to your needs. Professional installations, comprehensive applications support as well as high standard of post-delivery service are commitments Bruker Optics makes to each of its customers.



Technologies used are protected by one or more of the following patents:  
US 7034944

## Standards and Approvals

CE labeled and complies with the following directives:

- EMC Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- WEE Directive 2012/19/EU
- RoHS II Directive 2011/65/EU
- RoHS III 2015/863/EU
- NRTL approval

**Bruker Optics is ISO 9001 and ISO 13485 certified.**

Laser class 1 product.

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