



## Finder SD

**A New Innovative NIR Analyzer**

*Exceptional Capability – Outstanding Value*



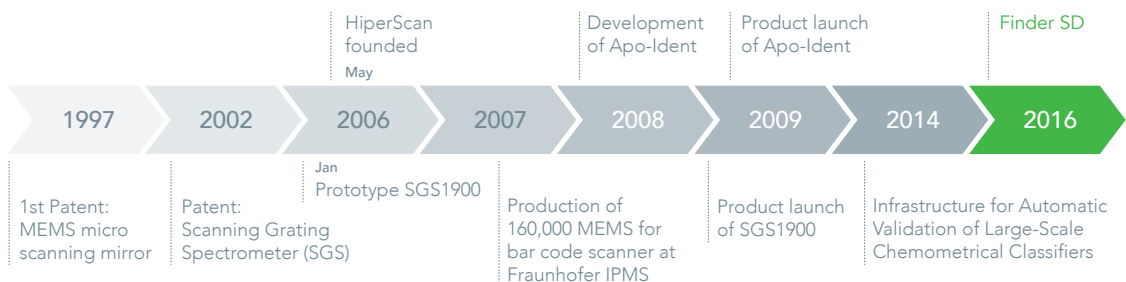
# Design for Success

The Fraunhofer Institute for Photonic Microsystems (Dresden) developed the first micro-scanning technology in 1997 which after intensive research resulted in the capability to produce high performance and consistent gratings for use in near infra-red (NIR) spectrometers.

HiperScan was established in 2006 as a spin-off from the Fraunhofer Institute to commercialise this new technology with the aim of making NIR affordable and moving the technique from research to an everyday analytical tool. HiperScan is based on a tradition of supplying quality technologies and applications for the analysis of materials in the near infrared.

## Setting New Standards in NIR Spectroscopy

- ✓ **Finder SD makes NIRS convenient.**  
Applications are easy to integrate and optimise for existing processes.
- ✓ **Finder SD makes NIRS intuitive.**  
Optimised software interfaces for user-friendly analysis.
- ✓ **Finder SD makes NIRS routine.**  
Minimal sample handling and fast analysis.
- ✓ **Finder SD makes NIRS flexible.**  
Perfect for a wide range of sample types and may be optimised for new applications.
- ✓ **Finder SD makes NIRS affordable.**  
Low initial investment plus minimal cost per sample.



# Why NIR

Near-infrared spectroscopy (NIRS) is an analytical technique that is used for the identification and also the structural analysis of molecules and for measuring the quantitative composition of blends and composites. NIR spectroscopy makes use of the fact that electromagnetic radiation in the near infrared region is absorbed by the molecular vibrations of the chemical bonds which results in a spectrum which is specific to the active substances and therefore may be used to identify and quantify the individual components of a sample.



Consequently NIR spectroscopy is an ideal technique for determining and analysing a variety of substrates or products. As a genuine “green science” NIRS requires no additional chemicals or solvents as the samples are measured directly without preparation plus measurement is fast with a typical analysis time of 6 seconds per sample.

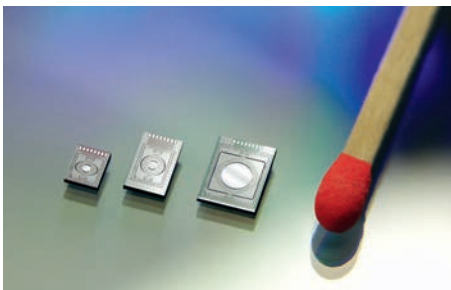
## Advantages of NIR spectroscopic analysis are:

- ✓ No sample preparation, non-contact and non-destructive
- ✓ Fast and automated, reproducible, simple, reliable
- ✓ Qualitative and quantitative determinations
- ✓ High penetration depth due to relatively low absorption coefficient of organic substances in the NIR
- ✓ Low cost of analysis

In many areas such as pharmaceuticals, medicine, agriculture, food and beverages, waste disposal, packaging and the plastics industry this convenient method is already accepted for quality and process control. However the traditional high cost of instrumentation has prevented the wider use and growth of NIR spectroscopy. The Finder SD system was introduced to make NIRS affordable and therefore accessible to many more facilities.

# Why Finder SD

HiperScan products have integrated new scanning grating technology based on a patented micro-opto-mechanical microchip (optical MEMS ) which was developed by the Fraunhofer Institute for Photonic Microsystems. This MEMS microchip includes an optical diffraction grating plus an electrostatic drive which rotates the grating 150 times a second to provide very fast scanning for optimum signal to noise.



Conventional NIR spectrometers use diode array detectors made from indium gallium arsenide (InGaAs) which are quite expensive and non-uniform. The MEMS scanning grating in the Finder SD uses a single InGaAs detector which results in uniform characteristics over the entire spectral range. This in turn facilitates transferable chemometric models that provide the same results on all systems, a benefit which is essential in quality control environments. Finder SD has a wide spectral range covering 1000 – 1900 nm which includes valuable analytical information in the region from 1650nm to 1850nm. This additional information enables high quality chemometric analysis for great confidence in the results.

All components are mounted on a solid aluminium optical bench and the unit is temperature controlled at 55 ° C to prevent any drift through thermal expansion for greater stability and reproducibility. By integrating different wavelength standards traceable to NIST it is possible to confirm the wavelength accuracy between each measurement and correct if necessary, which increases the accuracy within the entire range. As a result of this innovative design the typical accuracy of the measurement is increased by a factor of 3.

A further benefit is that MEMS technology results in a compact, bench top instrument yet which provides high performance at a practical price.

The top of the instrument has a smooth surface and is easy to clean. It is designed for no cross contamination between samples which is important in all applications to ensure the highest quality data.

The associated user-friendly Quickstep software is readily adaptable to meet your analytical requirements. Quickstep performs the following functions:

- ✓ Configuration and management of Finder SD
- ✓ Management, evaluation and monitoring of NIR spectra
- ✓ Visualization of spectral data
- ✓ Pass or fail reporting
- ✓ Automatic scheduled data collection
- ✓ Chemometric analysis of NIR spectra (quantitative and qualitative) \*
- ✓ Evaluation and development of chemometric models \*
- ✓ Search large spectral libraries \*
- ✓ Conversion between different data formats (CSV, JCAMP, SPC)

The platform-independent interfaces allow you to conveniently insert the spectrometer into existing processes.

\* Additional extension (plugin) required

# Finder SD

Finder SD is compatible with the comprehensive HiperScan Chemometric Information Database (CID) which may be used for creating secure chemometric models and for validation purposes. As a result of reproducible data collection, drift free operation and optimised chemometrics, Finder SD provides accurate quantitative as well as qualitative measurements. Secure data every time.

A validated comprehensive excipient library is also available to meet the needs of the pharmaceutical industry. Finder SD is the perfect lab companion.

## Benefits

- ✓ Patented MEMS grating technology with internal calibration using NIST standards
- ✓ Solid and thermally stabilised optics
- ✓ Fast scanning 150 scan/sec with a six second analysis time
- ✓ Easy clean – no carryover
- ✓ Dustproof
- ✓ Quickstep user interface
- ✓ Off the shelf libraries or make your own
- ✓ Validated excipient library



# Quality you can trust

## NIRS in the Pharmaceutical Industry

According to the European Pharmacopoeia (Ph. Eur.) and the Ordinance on the Operation of Pharmacies, the application of alternative, innovative identification methods are authorised for use to improve analytical procedures and NIRS is one of the latest techniques to be accepted and implemented in such laboratories.

In Section 2.2.40, the Ph. Eur. describes NIRS as a suitable method for checking substance identity if used with a secure identification method by means of a validated database established on a sufficient number of tested samples. The database should include typical substance variations which may occur and the validation parameters are robustness and specificity (=stability over a significant period of time and over varying environmental conditions). Finder SD meets these requirements.

The 100% specificity and stability for the Finder SD have been proven through a comprehensive validation process which includes over 330,000 spectra traceable to certified raw materials and which used more than 1,100 source materials: solids, semi-solids/liquids, ointments, granules and herbs according to Ph. Eur. 8.

The analysis of active ingredients and additives or formulations for pharmaceutical products is time consuming and expensive. Testing requirements are becoming ever more complex and speed of analysis without compromising analytical reliability is a high priority. NIRS is the ideal technique to reduce this "bottle neck" in the workflow as it is fast, requires no sample preparation and is highly accurate. In the Pass or Fail mode Finder SD will give an answer in six seconds and is the perfect instrument for use by non-specialist staff.



Finder SD is also a great tool for proving ingredients which are not contaminated, counterfeit or mislabelled therefore helping to prevent an expensive and possibly life threatening mistake.

## NIRS in the Food Industry



The Food industry is particularly dependent on the monitoring of chemical ingredients such as fat, protein, sugar and water. Critical process parameters are now recorded quickly and permanently using integrated NIR spectrometers, monitoring the production process to the second. As a result, time-saving and non-destructive analysis of many solid, semi-solid and liquid substances is achieved without compromise. With the implementation of the Finder SD analysis system in equipment, machinery or an at-line laboratory for the production process, substantial added value for quality assurance may be achieved even in small facilities. Due to the novel scanning grating technology (MEMS) that is used, the dustproof Finder SD system is fast, robust and reliable. The most important factor for use in food production is the creation of a guaranteed chemometric model that meets all technical and regulatory requirements. As the Finder SD is very fast and non-destructive in operation it is possible to take several representative samples to compensate for non-homogeneous sample types resulting in higher quality analysis without additional costs.

## NIRS in the Chemical Industry

The monitoring and evaluation of the properties of samples are of fundamental importance for all processes in the chemical industry. Many techniques are used to determine sample properties however most are time consuming due to complicated sample preparation prior to analysis or use slow analytical methodology. NIRS overcomes all of these issues as it is fast, accurate and reproducible while requiring minimal sample preparation. The added benefit of NIRS is that this powerful technique is simple to use by non-specialist staff through to research chemists to provide high quality analytical data, day in day out.





Using the Finder SD NIR analysis system plus quality chemometric modelling software, many of the analytical questions raised in development, production or final QC may be answered quickly and non-destructively. NIRS may be used for monitoring of upstream and downstream production processes and continuous monitoring is a guarantee of high quality in all aspects of the product.

Finder SD is a very convenient and cost effective solution to chemical analysis whatever the application area.

## NIRS in Agriculture

The compact and dustproof nature of the Finder SD means it is ideally suited to agricultural applications either in the laboratory or in the field. Fast, direct and no preparation means that reliable results are produced every time. Knowing the crop quality or when to harvest is a major financial consideration so having all the information readily available when required on which to base management decisions is sure to result in cost savings and improved profitability. Finder SD is a very affordable solution to improved decision making.



NIRS is used for monitoring the success of the harvest by determining the crude protein, starch and moisture content or for determination of substrate nutrient quality prior to planting. It is also used by manufacturers of harvesting machines, for green fodder and pasture land technologies, substrate monitoring for biogas plant providers or nutrient management as a module for such as slurry tanker manufacturers. Whatever the problem Finder SD has the answers.

# Specifications

Spectral range	1000 – 1900 nm
Spectral resolution	10 nm (optional 3 nm to 15 nm)
Light scattering	< 0.2 %
Measuring time	< 7.7 ms per scan
Detector	InGaAs single detector, stabilised

## Software Options:

- QuickStep software for data acquisition and visualisation  
Operating systems: Windows 7, Windows 8, Windows 10 (x68/amd64),  
Linux (x86/amd64/ARM)
- Development kit for integration into your own application  
Operating systems: Windows 7, Windows 8, Windows 10 (x68/amd64),  
Linux (x86/amd64/ARM)
- Sensologic software for efficient development of chemometrical models, for data acquisition and for routine measurements  
Operating systems: Windows 7, Windows 8, Windows 10 (x68)

## Advantages

- ✓ Temperature-stabilised
- ✓ Dustproof
- ✓ Can be fully integrated
- ✓ Customisable design
- ✓ Robust
- ✓ Device-internal calibration
- ✓ Optional: optical filter

Wavelength stability – Wavelength accuracy	± 0.5 nm (in entire temperature range)
Wavelength reproducibility	± 0.2 nm (in entire temperature range)
Photometric reproducibility	0.1 % (average over 500 scans at 25 °C)
Photometric linearity n (max/RMS)	1 % / < 1 %
Light source	tungsten-halogen
Probe/optical input	diffuse reflection, 23 mm diam. (powder, scattering solid, transmittance inset for liquids and pastes)
Thermal stabilisation	Yes
Storage temperature	-20 to 60 °C (non-condensing)
Dimensions	200 x 232 x 172 mm <sup>3</sup>
Weight	4.55 kg
Interfaces	USB type B (connections for start button, status LED, additional connections optional, e.g. for motor control)
Power supply	12 V/8A DC
Operating temperature	15 to 35 °C
Scope of delivery	<ul style="list-style-type: none"> <li>• Finder hardware</li> <li>• QuickStep software</li> <li>• optional: DLL</li> </ul>



