MULTISPEC®

UV/VIS/NIR Spectrometer Systems for the Optical and Coating Industry

Copyright: Interpane, Lauenförde

tec5
five
Technology for Spectroscopy

MULTISPEC®

Light is fascinating. Growing of our fascination with light, we develop innovative measurement systems used in a variety of industries. We are at home with many interesting applications – which are as diverse as our customers.

At tec5, we provide a complete range of products and services for any optical measurement demand. We can supply all required components and assemblies, as well as engineering assistance. We are a fast and flexible supplier for all your needs.

- Fast and Continuous Measurements
- High-Quality Spectrometer Modules from Carl Zeiss
- Internal Referencing Assures Drift-Free Operation
- Modern Multiplexer Technology for Multi-Channel Applications
- Standard Fiber-Optic Connections
- Complete System Solutions
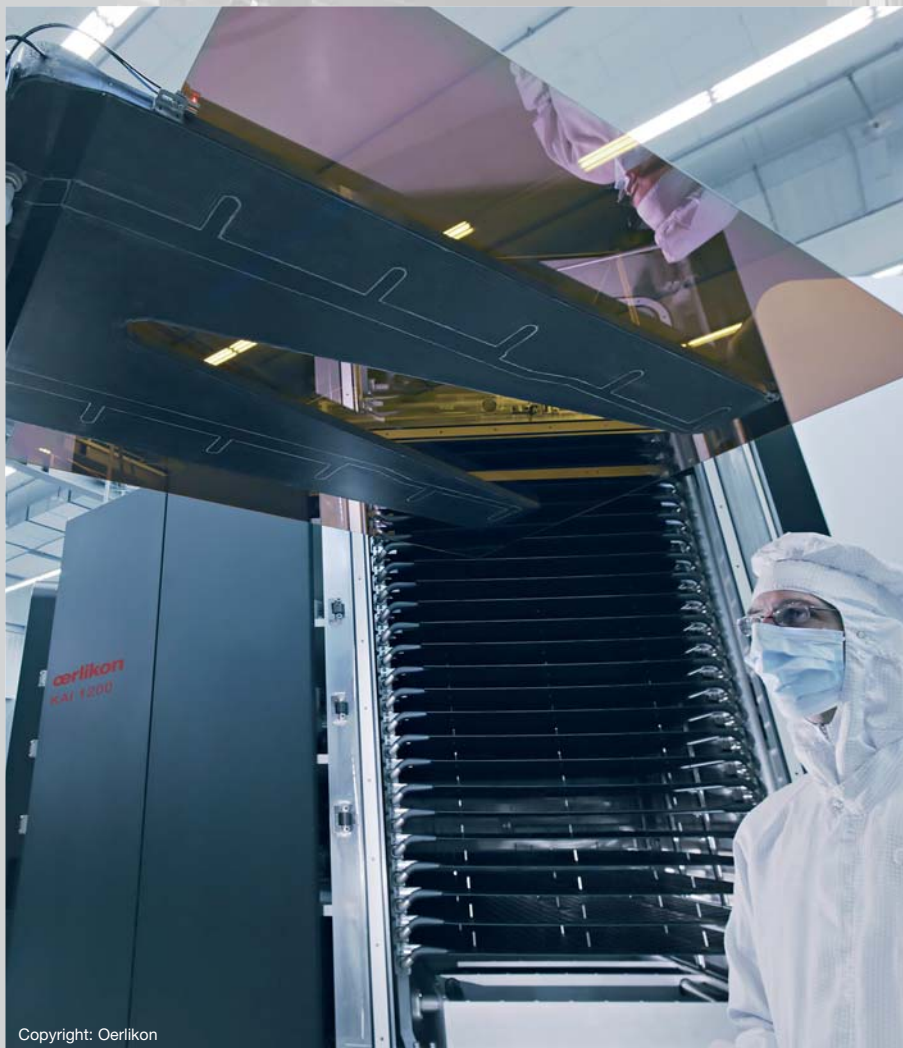
Transmission

Reflection

Color

Film Thickness

Coatings, Films

Architectural Glass

Optical Components

Inline, Online, Atline, Lab

Quality Control

Copyright: Oerlikon

APPLICATION EXAMPLES

THIN FILM THICKNESS

can be determined within milliseconds by using white-light interference, while the production process is running, without destroying, changing or even touching the surface of the layers.

The interference pattern of the typical spectrum, created by one or two transparent layers of 0.2μm up to 200μm thickness, is analyzed by a specially developed Fourier Transform algorithm.

9.576 μm
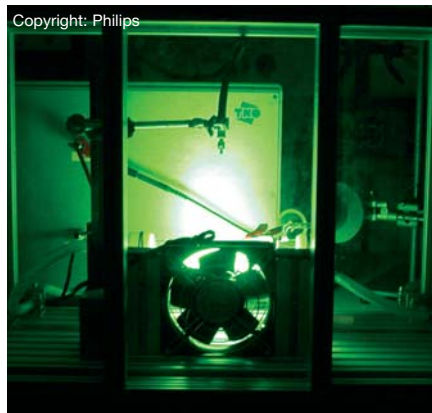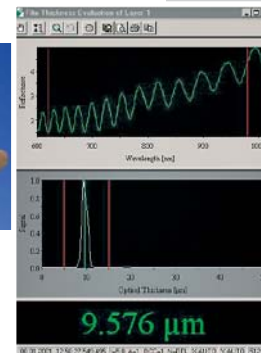
LIGHT EMISSION

Copyright: Philips

"Day by day, spectrometer systems from tec5 help Philips judge exactly how bright their ideas work".

The picture shows the experimental test setup for an "electrodeless" lamp based on a dielectric barrier discharge (DBD): The plasma radiation of the DBD lamp is converted into visible (green) light by an integrated phosphor coating. The radiation intensity from the lamp is captured side-on by the fiber input of a tec5 MultiSpec UV spectrometer system.

COMBINED TRANSMITTANCE AND REFLECTANCE ANALYZER FOR OPTICAL FILTERS

A tec5 system is used for production control at Prinz Optics, a subsidiary of Berliner Glas Group. Prinz Optics is a supplier of dichroic filters, which are produced using a wet-chemical coating (sol-gel) procedure.

"The tec5 system allows 100 % final inspection to meet the highest quality demands, and to achieve the standards according to ISO 9001".

The system is equipped with a specially designed optical unit to perform simultaneous transmittance and reflectance measurements within milliseconds. Small filters can be placed into a sample holder inside a measurement chamber. For production control, filters with bigger dimensions also have to be measured non-destructively. A special design allows insertion of the panes directly into a slit-shaped measurement head.

Copyright: Prinz Optics

FLOAT GLASS PRODUCTION

Copyright: Pilkington

Pilkington is one of the world's largest manufacturers of glass products. The production of float-glass is one of their activities.

"Coated glasses are important products for Pilkington and tec5 MultiSpec systems are used to analyze quality relevant parameters directly in the process".

HIGH PERFORMANCE
SPECTROMETER SYSTEMS

Oerlikon / Unaxis

Pilkington

Rodenstock

Essilor

Leybold Optics

Prinz Optics

Swiss Optics

Philips

and many more

MultiSpec® is a modular system family of fast detector array spectrometers for UV, Color and NIR. Various spectral ranges and resolutions, as well as PC interfaces are available. The integrated spectrometer modules are of highest quality, without any moving parts and with outstanding long-term stability. Therefore, MultiSpec systems can be directly integrated into the production process, providing reliable results in real-time. Standard optical connections allow easy integration of a large variety of fiber-optic measuring heads and probes.

- Available Spectral Range from 190nm to 2500nm
- Fast, Precise, Reliable and Non-Destructive Data Acquisition
- Modern Detector Array Technology
- Wide Dynamic Range of up to 16 Bit

MULTISPEC® NIR

MultiSpec® NIR instruments offer various spectral ranges between 900nm and 2500nm. tec5 uses the latest (extended) InGaAs technology with a high dynamic range of up to 16 bit, excellent signal to noise ratio and wavelength stability. The detector array design provides acquisition of complete spectra within milliseconds.

MULTISPEC® UV-VIS

Solarization-free UV stable spectrometers and light guides allow fiber-optic spectroscopy down to 190nm. The MultiSpec® systems can be equipped with various light sources including deuterium/halogen, long-life halogen and Xe flash lamps. To reach optimum stability, tec5 uses only precision lamps with prealigned sockets.

MULTISPEC® CCD

The back-thinned / back-illuminated CCD technology combines very high sensitivity over the whole spectral range from UV to NIR, with the large dynamic range of a classical photo-diode array. These CCD arrays are especially suitable for low-light-level detection like fluorescence, film thickness, plasma or diffuse reflection measurements. The ability to detect even the smallest amount of light relates directly to the short exposure time necessary for high-speed process control.

Complete solutions with integrated IPC and different racks of IP class 20 - 65

MultiSpec® Pro
and More Software Tools

tec5 offers various software packages for laboratory and process, as well as development kits to fulfill various customer's requirements.
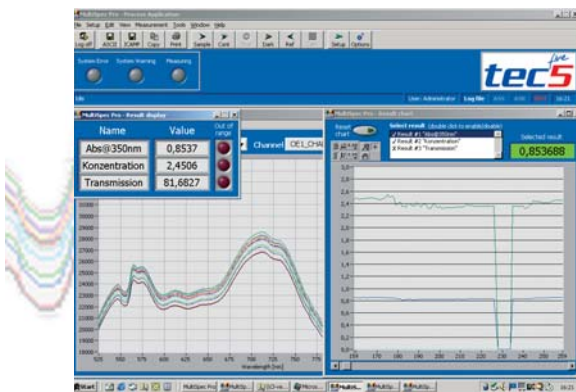
Software tools, drivers and sdk`s

Benefits

- Continuous measurement with automatic data / result storage
- Simultaneous handling of various windows containing spectra, charts, results or other information
- Direct data export in ASCII or JCAMP format
- System diagnostic protocols (GMP)

and many more

MultiSpec^Pro is a modular software package with various data acquisition modes, data display / processing, and output options, optimized for process applications. It is offered by tec5 as a basic version only or with additional modules, e.g. color measurements, chemometric prediction, and process communication.

MultiSpec Opti and TFM-1 Software Package offers easy to use application software for colored lenses and other optical components. An SQL database is provided for total archiving, data base search functionality and flexible creation of measurement protocols.

TF^Pro UV-Vis Film Thickness Software is a software package designed to determine the film thickness of transparent layers using white-light interference. It provides spectrometer system control, data acquisition and processing, as well as many different display options.

Software Development Kits for easy integration into customer specific applications are available, with direct support for C/C++/ Visual Basic and Delphi as well as a function library for the LabVIEW™ environment. The library SDPROC32 offers ready-to-use dialogue boxes for spectral data acquisition, configuration, and parameter setting on a high level of abstraction. An easy link to script languages like VBA ➡ Microsoft Excel etc. is possible.

GRAMS/AI® Driver links tec5 hardware to GRAMS/AI® from Thermo Galactic by the "My Instrument" interface. This spectroscopic software package can be extended by many add-on modules and complies to 21 CFR Part 11.

Process Communication

tec5 spectrometer systems can be equipped with analog (4-20mA) and digital I/Os, or Profibus interface, to transfer results and status information to a process control system. In addition, the system can be remotely controlled by a host system (SPS, PLS).

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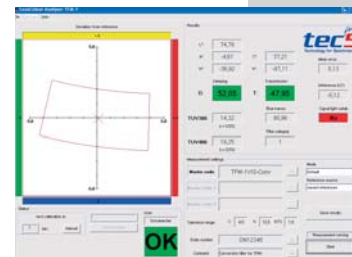
Customer Specific Instrumentation / OEM Products

Cooperating closely with our customers and taking advantage of their application specific experience, tec5 develops and produces custom designed components, (sub)assemblies, and complete instrumentation for many different measurement tasks with the emphasis on optical spectroscopy.

- Instrument Conception, Design, Prototyping
- Contract Development of Hardware and Software
- Batch Production According ISO 9001 Standards
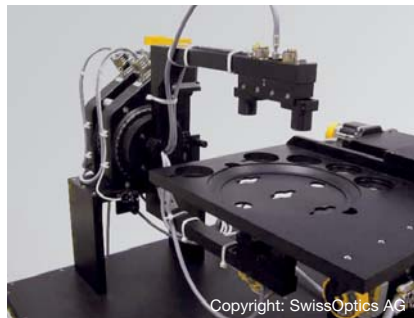
Customized System Solution: SwissOptics

Copyright: SwissOptics AG

This diode-array spectrometer system is installed directly in the production area - in the clean room of the optical coating - and is dedicated to control series production.

More than 10000 measurement jobs are carried out in 2-shift operation each year.

The spectrometer system measures transmission as well as reflection in the wavelength range of 360nm – 1050nm. Polarization, measurement angle and sample position are selected and processed automatically.

The operation of the spectrometer is reduced to only a few steps, and the rest is handled by the fully automated control. The user inserts the sample, enters the batch number on the user interface, and from thereon the set measurement procedure for a customer specific test protocol follows automatically. The system was developed for SwissOptics AG, a subsidiary of Berliner Glas Group.

OEM Solution: TFM-1 LensColour Analyser

The TFM-1 LensColour Analyser is designed for production control in the tinting of ophthalmic lenses.

The TFM-1 acquires the spectral characteristics over the wavelength range from 280nm to 780nm. The color values L*, a*, b* and the transmission in the UV and VIS are determined in accordance with the ISO standards. The spectra are compared to references saved in a SQL database. The system was developed in cooperation with Rodenstock GmbH.

Fiber-Optic Accessories
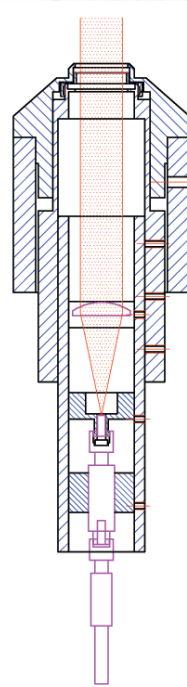
Fibers, Optic Components and Solutions

Collimating Optics

Copyright: Hellma

Measurement Set-Up for Lenses

Vacuum Feed-Through for Fiber-Optics

Detector-Array Technology

Simultaneous readout spectrometers are a fundamental part of today's optical spectroscopy. Equipped with a detector array, and based on a solid design, fast data acquisition is possible. With these features they are ideal devices for process and production control.

tec5 systems are based primarily on high-performance optics from Carl Zeiss. The concept of the MMS, MCS, PGS families of spectrometer modules is focused on a high signal-to-noise ratio, as well as an outstanding wavelength accuracy and long-term stability.

OEM ELECTRONICS

tec5 has been developing operating electronics for detector arrays for years.

Therefore, tec5 can offer a complete range of high-quality components for state-of-the-art spectroscopic devices. Take advantage of our OEM products as many well-known instrument manufacturers do already!

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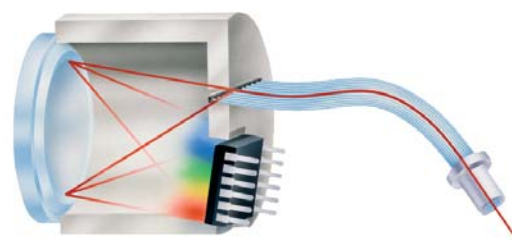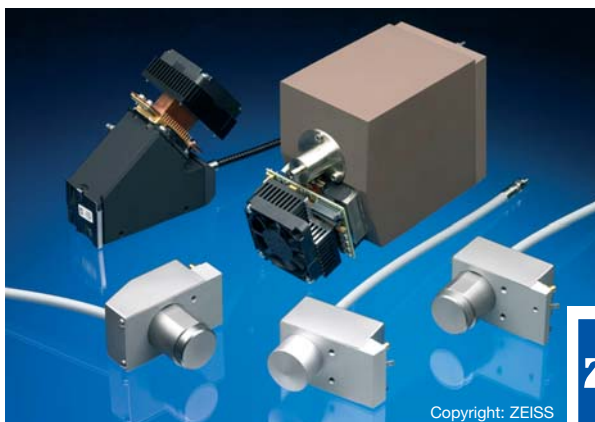
ZEISS

PRODUCTS AND SERVICES

tec5 manufactures high-quality, state-of-the-art products for detector array based optical spectroscopy, from single OEM components like operating electronics up to complete UV/VIS/NIR spectrometer systems for a wide range of applications and demands.

- Optical and Coating Industry
- Lighting and Atmospheric Research
- Chemical and Pharmaceutical Industry
- Agricultural and Food Industry
- Semiconductor Industry

tec5 has been certified according to ISO 9001 since 2000.

COMPANY PROFILE

tec5 Technology for Spectroscopy was established in 1993. To meet future requirements of a high-tech enterprise, tec5 was incorporated at the end of 1999. The company is based in Oberursel, just north of Frankfurt/Main, in a modern 900 square meter facility with a staff of more than 20 employees. In 2001 the North American subsidiary tec5USA was founded in Plainview, east of New York City.

CUSTOMER ADVANTAGES

- Far Reaching Know-How in Optics and Photonics
- Complete Coverage from Contract Development to Serial Production
- Direct Access to all Necessary Technologies with In-House Capacities
- Supply of Single Components as well as Complete System Solutions
- Worldwide Distribution and Support

"OVERVIEW AND COMPETENCE IN PLANNING, SENSING AND PROCESSING"

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