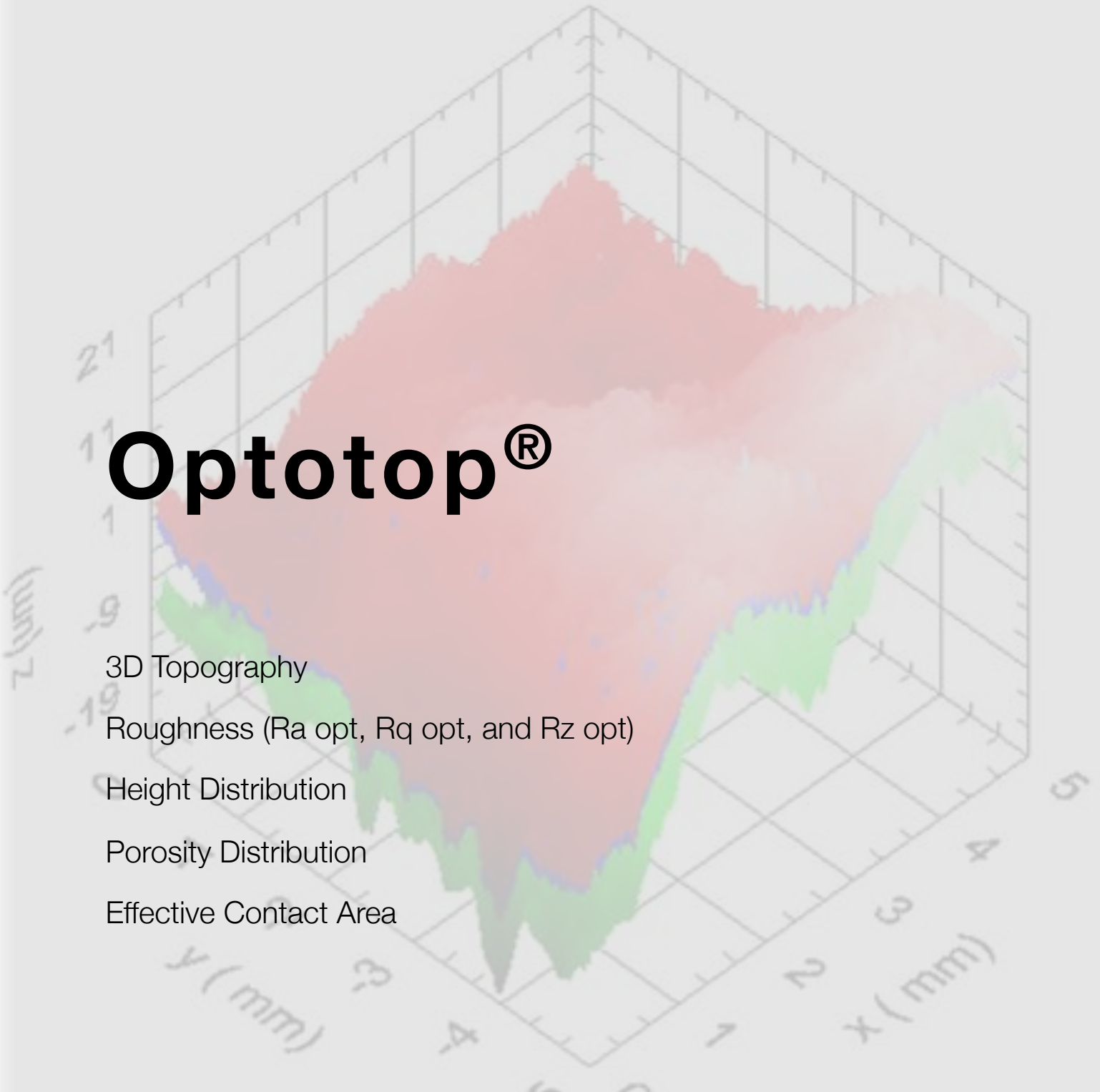
INNOWEP GmbH
MEASURING & TESTING



Optotop®

3D Topography

Roughness (Ra opt, Rq opt, and Rz opt)

Height Distribution

Porosity Distribution

Effective Contact Area

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Highlights

- Big measurement area up to 60mm x 60mm
- Easy operation
- Non-contact measurement
- Variety of optical sensors with different resolution
- Reproducible and calibratable
- Fast data acquisition
- High local resolution

Basic Functions

Surface profile is a key parameter of a product's quality, which affects the product's overall performance. The height values (oftenly refers to the valleys and peaks) of the surface determines many functional features, eg. abrasion resistance, adhesion, etc.
Furthermore, the analysis of wear or abrasion rate after the mechanical tests is also needed to evaluate the quality of surface coatings. Therefore, an accurate measurement and documentation of the surface profile helps to make the right decision for the quality control.

Optotop® is a testing instrument which measures the surface profile in a non-contact fashion. The highly accurate measurement of the 3D topography makes it widely used in R&D for new materials development as well as in the quality control of manufacturing processes.

Parameters which can be measured with **Optotop®** include:

- Roughness
- 3D Topography/Mapping
- Macro & micro geometries
- Light intensity
- Porosity
- Effective contact area ratio

Additionaly, **Optotop®** can be adapted as a hardware module to UST® , a universal surface tester which applies tactile measuremet of 3D topography on a surface.

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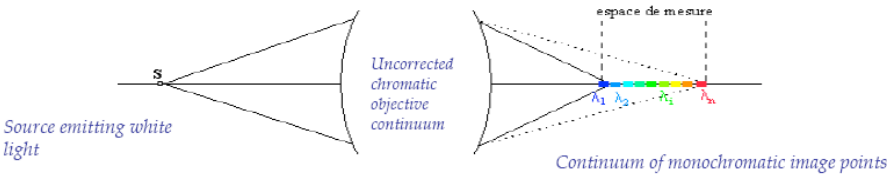
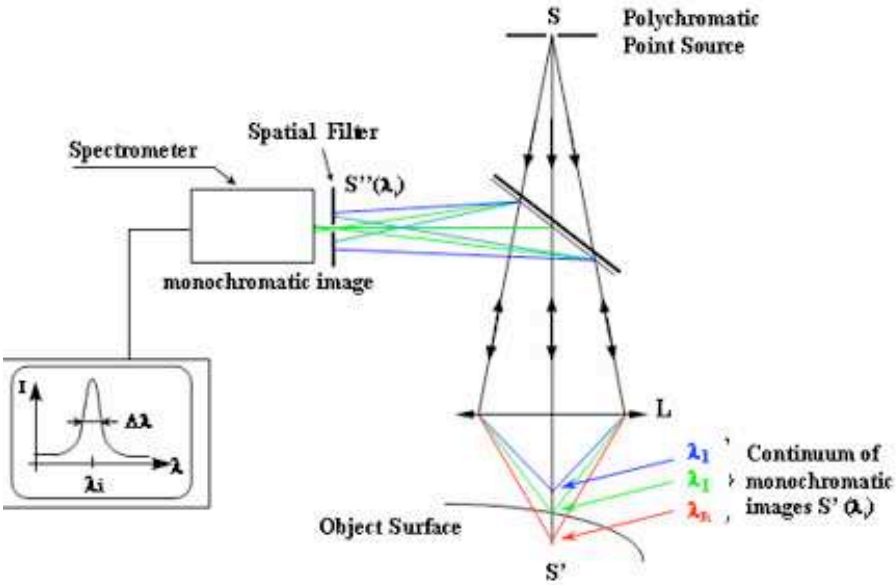
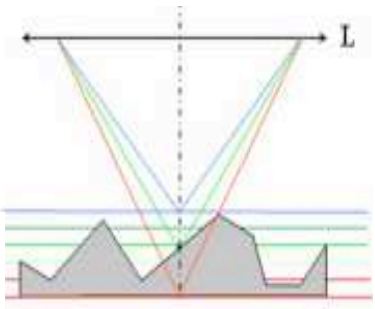
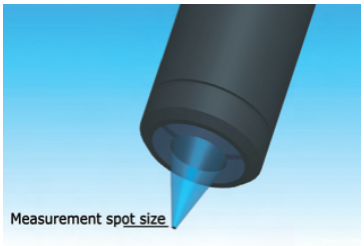
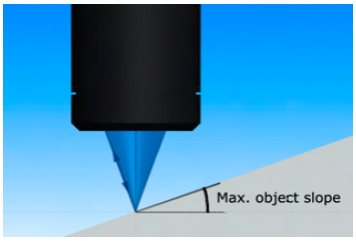
Test Principle











- Measurements via a chromatic confocal sensor
- High resolution with the choice of different sensors
- Non-contact measurement method
- A quasi-confocal setting with an extended field along the z-axis achieved by spectral encoding of the z-axis
- Comparison with ordinary microscopes which are limited by the wavelength of the visible light (min. spot size 0.8 µm), the resolution of the white light interferometry can reach up to 10 nm

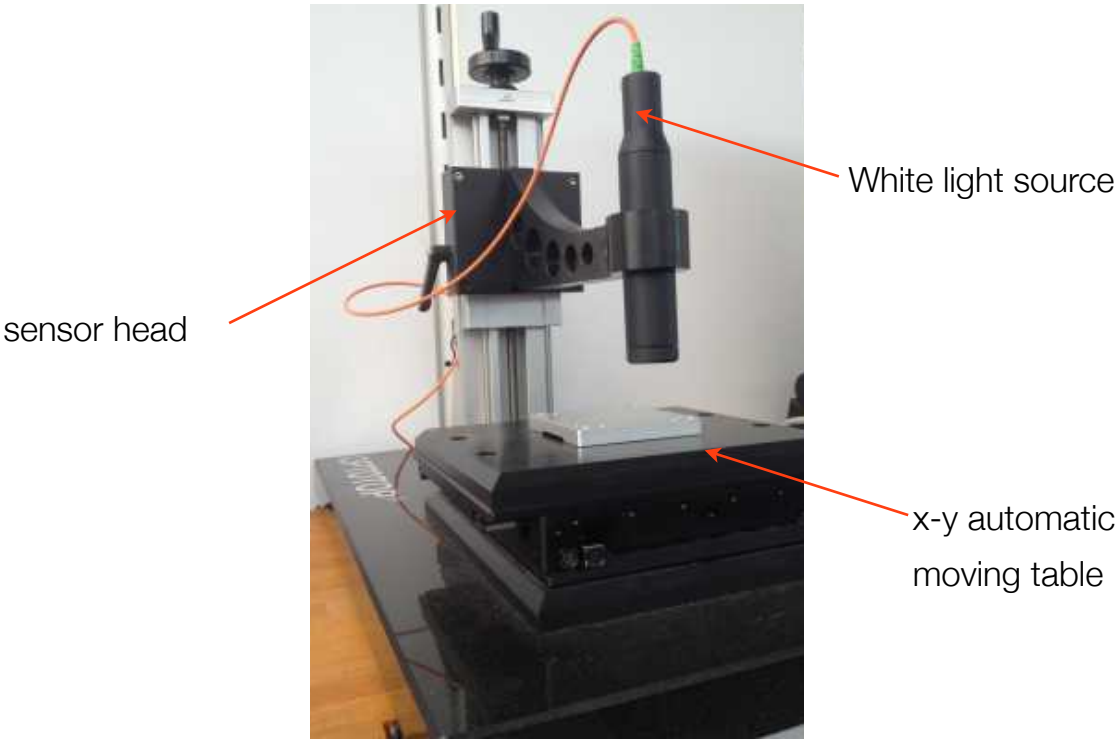
Applications

OptoTop® offers a wide range of quantitative measurements of 3D topography ranging from a few microns to hundreds of microns, especially in the Z-direction of the sample. By scanning the sample area in X-Y directions, **OptoTop®** enables the measurement of micro structure for all types of surfaces. These include flat, textured or curved upper surfaces, glossy and opaque materials.

Configuration

The main components of the measurement system are:

- white light sources (LED)
- a sensor head
- a high precision automatic x-y moving table
- a computer with a control system and built-in analysis software



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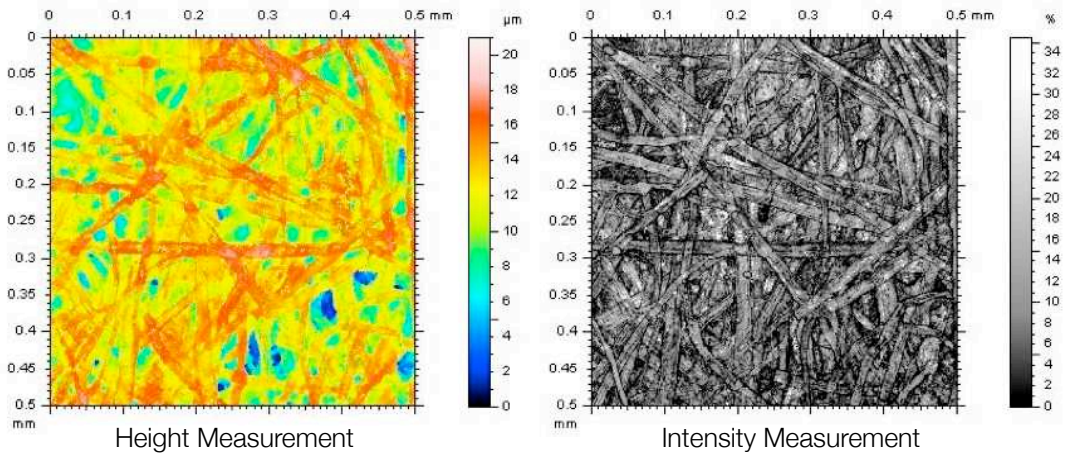
Examples

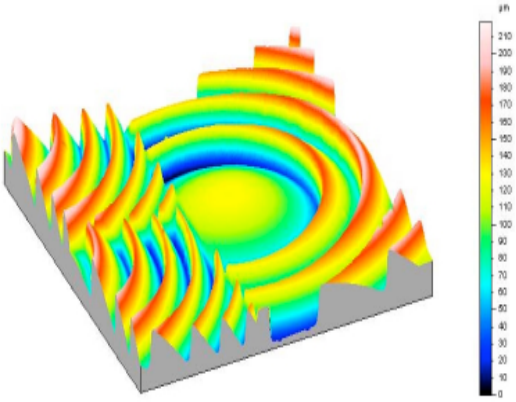
1. Printing Paper



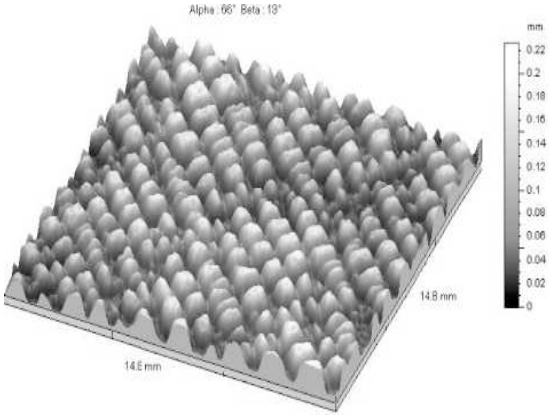
Height Measurement Intensity Measurement

For paper fibers, the distribution of the fibers and microstructure of the paper are the key parameters for the determination of the quality, homogeneity and functionality of a printing paper.

2. Fresnel Lens



3. Structured Leather



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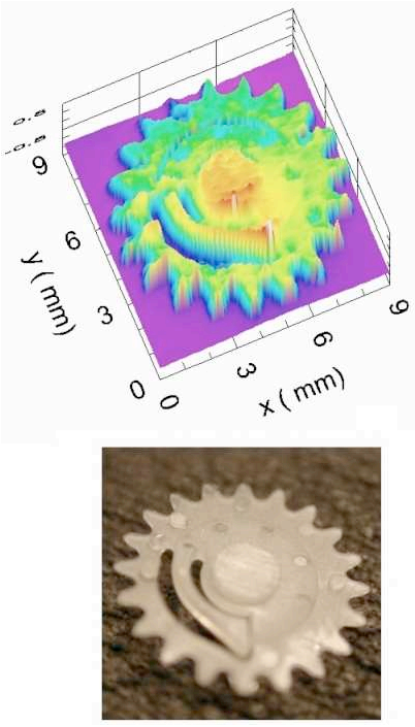
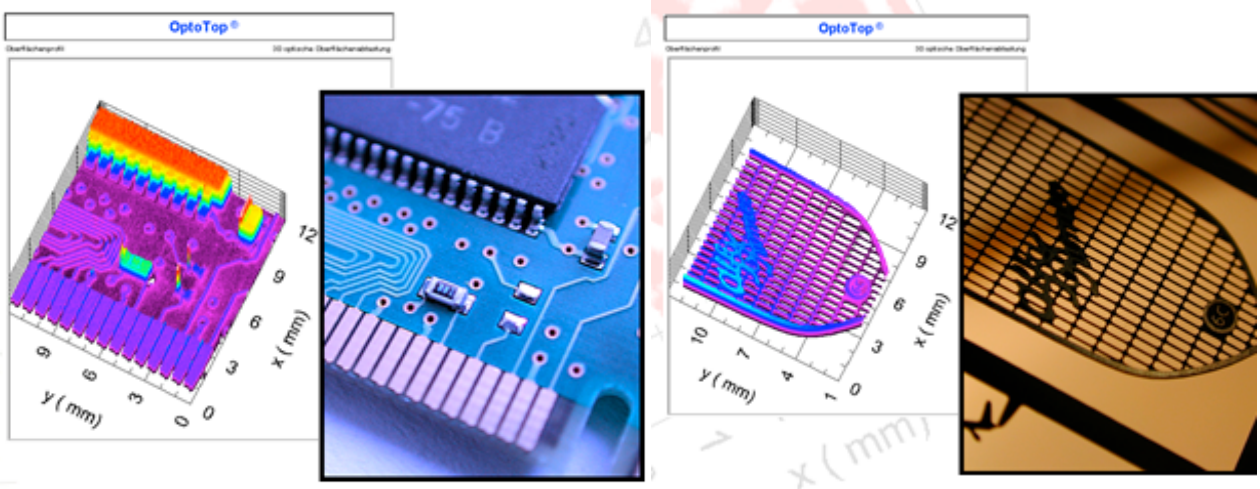
4. Micro Component



The geometry and the micro-topography of a micro component are measured by **Optotop®**. Those key parameters (e.g. depth, width, etc) are needed to ensure the reproducible quality during and after the manufacturing process.
It should be noted that **Optotop®** has the capability of measuring a relatively big sample in mm size with the AFM nanometer resolution.

5. Semiconductor



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Technical Specifications

Sensor	Chromatic Confocal		
Measurement Range (Z direction)	300 µm	1 mm	2 mm
Resolution in Z direction	12 nm	25 nm	75 nm
Lateral resolution	1.55 µm	2 µm	4 µm
Measuement distance	11 mm	12.7 mm	16.4 mm
Measurement frequency	30 Hz, 100 Hz, 300 Hz, 1 kHz		
Standard X-Y range	60 mm x 60 mm		
Velocity	0.1 ~ 10 mm/s		
Standard table size	165 x 165 mm or upon request		

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