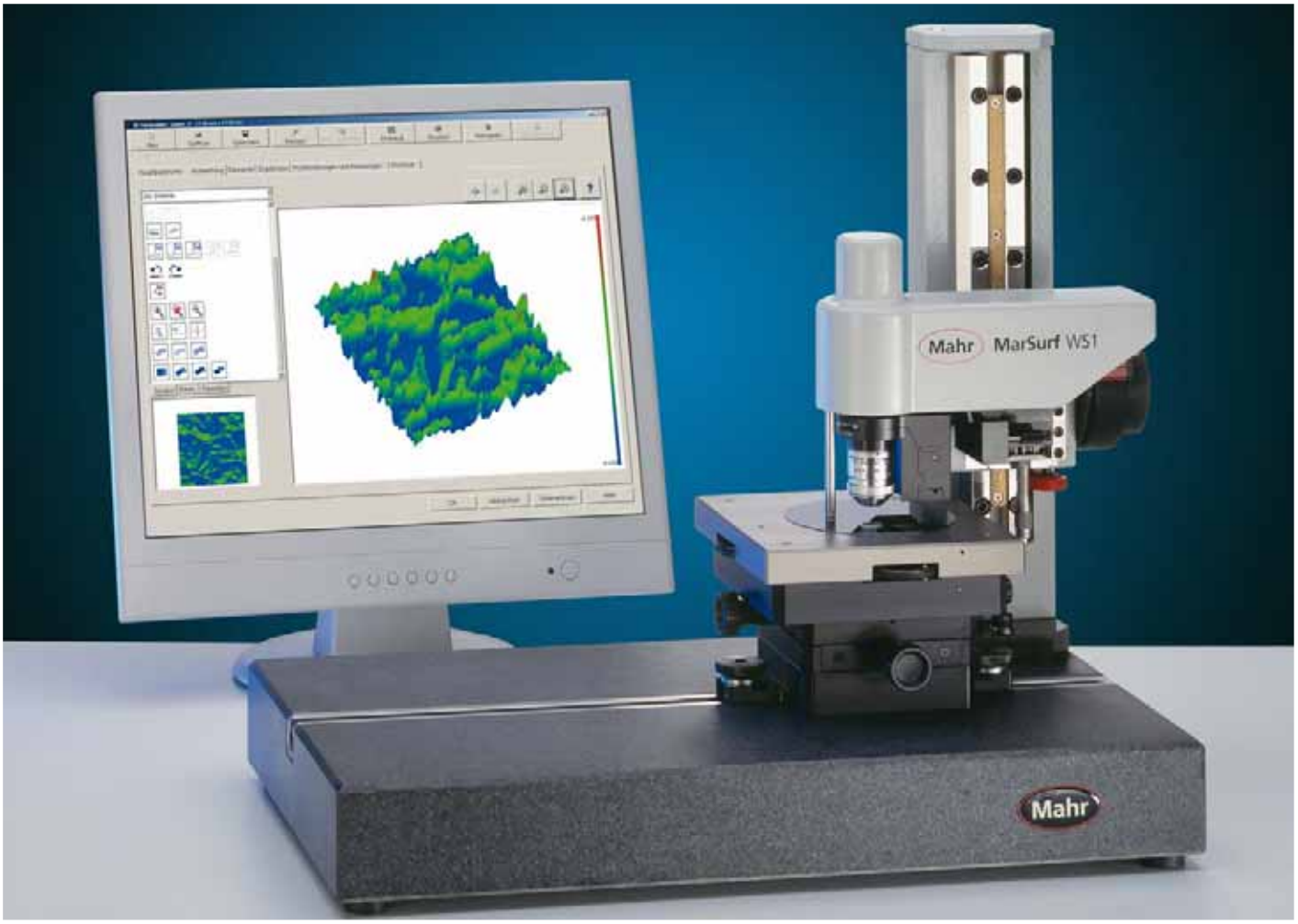
MarSurf



MarSurf WS 1

High-precision, non-contact measurement of surface texture using the principle of white-light interferometry

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Mahr

EXACTLY

Measuring times of only a few seconds
- Saves time and money

Compact and simple design
- Saves money through low-cost entry and saves space in your inspection room or production environment

Accurate results
- Thanks to 0.1 nm (.004 µin) vertical resolution
- Thanks to compact, reliable design
- Thanks to tried-and-tested evaluation software from Mahr

MarSurf WS 1 gives you a competitive edge
- Innovation in optical surface metrology
- Excellent vibration absorption (patent pending)
- Very small sensor dimensions
- Can be used in the workshop and laboratory

Mahr

MarSurf. WS 1 White-light Sensor Measuring Station

Description

High-precision, non-contact measurement of surface texture

Nowadays, the properties of surface topographies are increasingly influenced by new processing methods and new materials.

The traditional profile stylus method is often not adequate to characterize the functional behavior of surfaces. Three-dimensional recording and evaluation are required. Soft and thin-walled materials also require non-contact measurement.
Moreover, ever higher levels of surface quality are being achieved, greatly increasing the requirements placed on measuring systems in terms of resolution and measuring accuracy.

The **MarSurf WS 1** satisfies all these requirements:
- Vertical resolution 0.1 nm (.004 µin)
- Three-dimensional measurement and evaluation in only a few seconds
- Compact measuring station configuration for the workshop and laboratory
- **MarSurf XT 20** software
- Topographical evaluation software on the fully standardized and powerful **MarWin** software platform

Mode of Operation

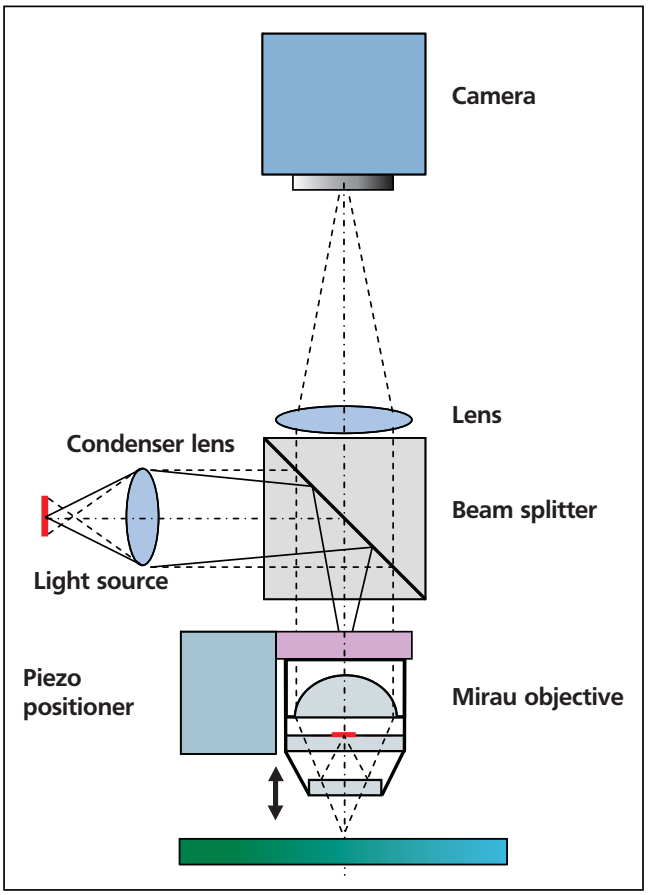
The **MarSurf WS 1** is an optical surface sensor which operates on the basis of white-light interferometry. This technology enables rapid, high-precision recording of surface topography on a wide range of materials.

The design is similar to that of a traditional interferometer, but uses white light instead of coherent light. White light has a short coherence length and therefore shows excellent properties for measuring surface topographies. In contrast to traditional interferometry, height information can be clearly assigned in the case of height steps in the test specimen.

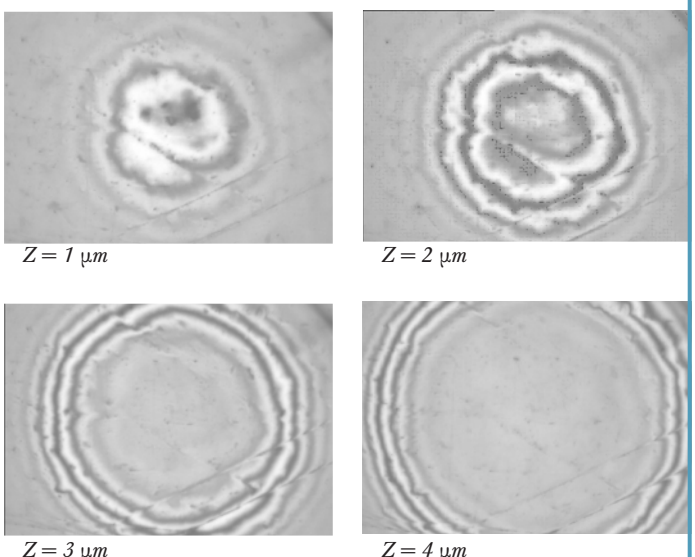
The area of the surface to be measured is displayed on a CCD camera. The surface area and a high-precision reference surface are imaged on the same scale by the interference objectives used (Mirau objectives) via a beam splitter so that the images of the sample and reference are superimposed to obtain an interferogram on the camera.

During measurement, the Mirau objective is moved in small steps in Z direction using a piezo positioner. The resultant interferograms are recorded as image stacks, evaluated and converted into height data.

Principle: White-light interferometry



Interferograms at various scan depths



MarSurf. WS 1 White-light Sensor Measuring Station - Applications

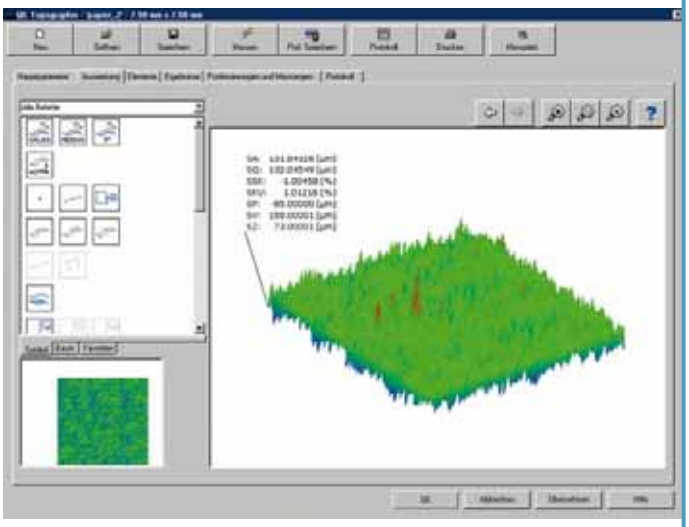
Measuring a silicon blank

Measuring a wafer section

Measuring the honing texture in a bushing that has been split open

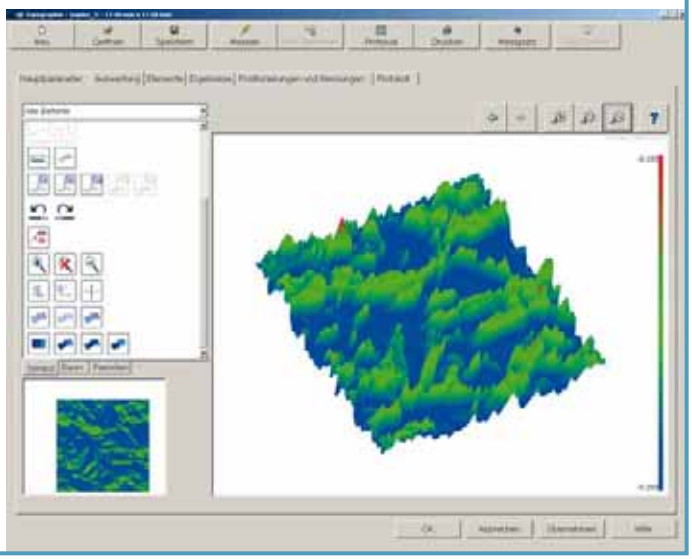
Applications

The **MarSurf WS 1** can be used both in precision inspection rooms and production environments. Other optical measuring principles quickly reach their limits when measuring various types of surfaces. Some cannot handle high surface reflectiveness while others cannot measure rough surfaces properly if, indeed, at all.
The **MarSurf WS 1** and its innovative measuring signal evaluation enables analysis of both reflective and rough workpieces. For example, the high vertical resolution allows you to measure the surface roughness of optical components such as lenses or mirrors with sub-µm accuracy. You are also able to measure the texture of micromechanical components. The material involved is irrelevant here. Glass, paper, varnish, metal, plastic, coatings and liquids can be measured.
The **MarSurf XT 20** topography software is a powerful evaluation tool with a wide range of functions. Thanks to the standardized MarWin software platform, you are also able to enjoy the benefits of the tried-and-tested **MarSurf XC 20** contour software.



Example of a paper surface. Topographical evaluation with 3D parameters

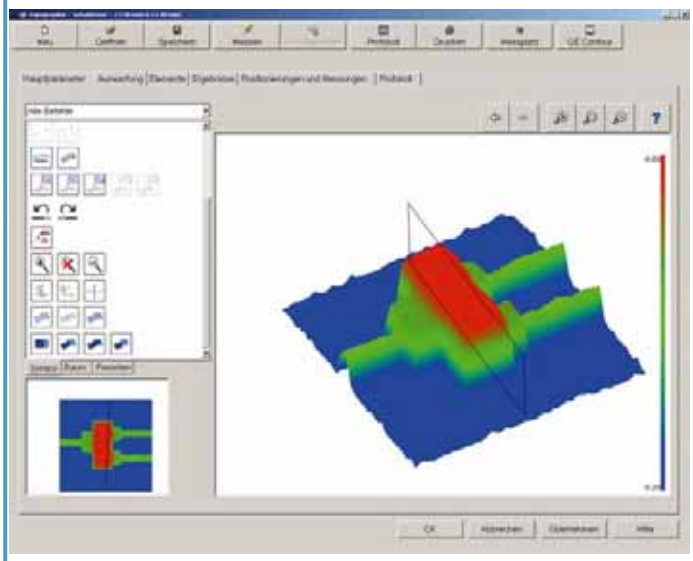
Example of a surface diagram



Benefits of This New System

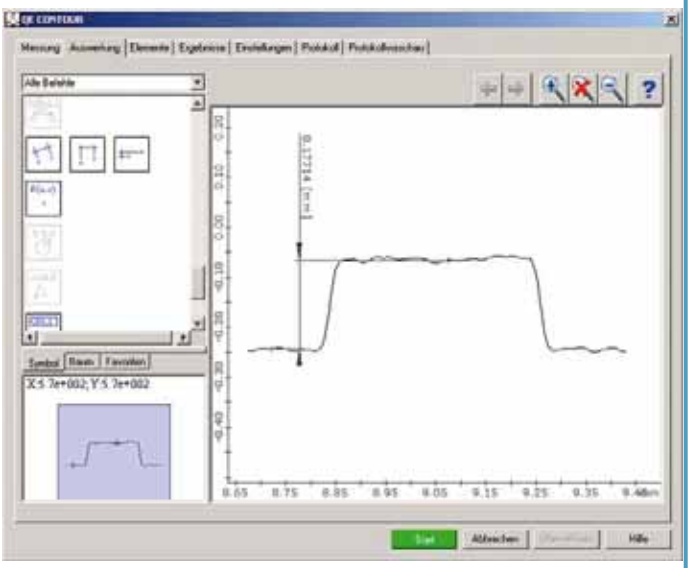
- Compact sensor
- New illumination concept
- Power supply via USB
- High image rate, i.e. short measuring times
- Sub-nanometer height resolution
- Measuring time (incl. evaluation, typically 20 to 30 s)
- Modular concept
- Exchangeable illumination and imaging optical path
- Evaluation with standardized **MarWin** topography software

MarWin. Topographical Software



Example of an electric component with sectional view and contour evaluation

The **MarWin** topographical software opens up a wide range of evaluation options. The software is very easy to operate.



The operator will have no problems in finding his/her way round the standardized **Mahr user interface** of the **MarWin software concept**.

MarSurf WS 1. Technical Data

Objectives	10× (Mirau)	20× (Mirau)
Measuring field size	1.6 mm × 1.2 mm (.063 in × .047 in)	0.8 mm × 0.6 mm (.031 in × .024 in)
Working distance	3.6 mm (.142 in)	3.6 mm (.142 in)
Lateral sampling interval	2.5 µm (98 µin)	1.25 µm (49 µin)
Vertical resolution	0.1 nm (.004 µin)	
Measuring range (vertical)	100 µm (.004 in) (optionally up to 400 µm / .016 in)	
Measuring speed	1.5 µm/s to 15 µm/s (60 µin/s to 600 µin/s)	
Number of pixels of camera	658 × 494	
Residual noise Rz during measurement on optical flat	2 nm (.079 µin)	
Dimensions of measuring head L × W × H	201 mm × 63 mm × 157 mm (7.9 in × 2.5 in × 6.2 in)	
Dimensions of measuring station with ST-G		
L × W × H	500 mm × 300 mm × 415 mm (19.7 in × 11.8 in × 16.3 in)	
Weight of measuring head	1.3 kg (2.87 lbs)	
Operating temperature	5 °C to 40 °C (41 °F to 104 °F)	
Recommended operating temperature	20 °C ± 2 °C (68 °F ± 2 K)	

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