



Process control during the manufacturing of artificial leather

Measuring task:

Process control during the production of artificial leather destined for automotive interiors, ensures that the original form of the leather reference patterns be accurately transferred to the artificial leather. The forming tools have metal surfaces; the leather patterns as well as the artificial leather are smooth and very soft silicone imprints have to be made. In addition to the coarse leather structure, the micro structure onto the knobs and into the scars has to be determined as well. If possible, all measurements should be made with the same sensor.



Fig. 1: Typical structure of artificial leather

Problems:

Conventional, contact stylus instruments mechanically scan the surface. They cannot measure soft surfaces correctly, and they are not quick enough to carry out 3D measurements.

Non-contact measuring auto-focus systems use a lens located in the sensor to scan the surface by following, and focusing on the various heights within the sample. Therefore, the highly structured leather surfaces can only be measured very slowly.

Artificial leather surfaces for automotive interiors should not reflect in the windscreen. This means, they must absorb light to a high degree. An optical sensor must be very sensitive to be able to determine the topography from the small amount of light that is diffused on a black artificial leather surface.

Solution:

The FRT MicroProf®: with a confocal, chromatic distance sensor. The sensor focuses white light onto the sample and determines the surface heights from the spectral distribution of the diffused light on the sample at one measuring spot. For different measurements, various sensors are available with a measuring range up to 3 mm, and a vertical resolution from 3 nm.

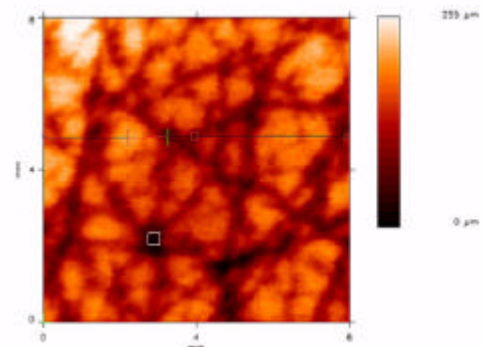


Fig. 2: 8 x 8 mm² image of an artificial leather surface with cutting line and marked area

Fig. 2 and Fig. 3 show the topography of artificial leather surfaces measured with the FRT MicroProf®. A range of materials (leather, metal, silicone, plastics) can be measured with this powerful system.



For all measurements with the FRT MicroProf[®], the full resolution (3 nm vertical) is available, for any selected area.

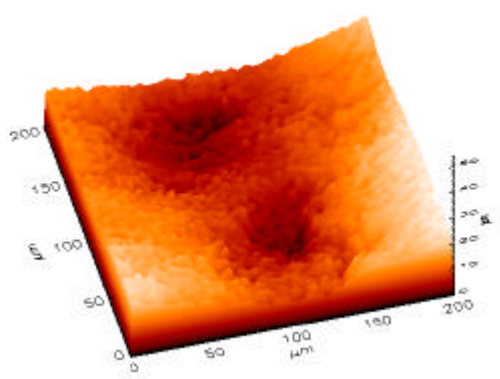


Fig. 3: High-resolution topography measurement with the cutting area given in Fig. 2

The Mark III software program installed in the FRT MicroProf[®] evaluates all the measured data: The height of the knobs,

The width of the pits and the steepness of the flanks. The surface roughness is determined on small surface areas between the pits.

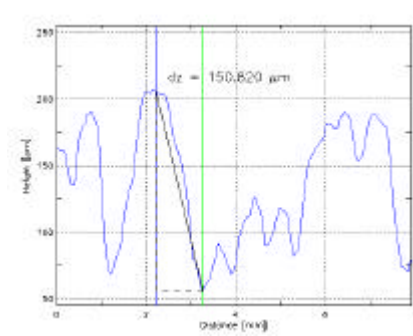


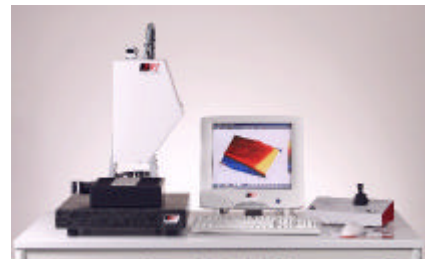
Fig. 4: Profile along the cutting line given in Fig. 2 and measurement of the scar's deepness.

The following FRT measuring systems can be used for this measuring task:

The MicroProf[®] is the universal instrument which can be used from the development through final inspection of the structures.



The MicroSpy[®] is predestined for rapid and easy process control by the production operator.



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