Microstructured surface

Amplitude: $A=0.1 \mu m$
Wavelength: $\lambda=100 \mu m$
High-precision functionality nanosurfaces

Principle of generating microstructured surface

Using Fast tool servo (FTS) technique

Improvement of the fabrication accuracy

Improvement of the profile accuracy in local area (1mm order)

Evaluation of profile

Machined profile

Compensation

- Profile error caused by round nose geometry of the tool
- Profile error caused by data digitization
- Tool centering error

2-Dimensional Discrete Fourier Transform (2D-DFT)

Profile spectrum

Profile error components (max. 10nm)

Realized high precision

Compensation of the profile error components (max. 1.5nm)

Improvement of the profile accuracy (=flatness) in global area (100mm order)

Evaluation of flatness

PV=0.26$\mu m$

Come from motion error of the machine tool

High precision measurement of motion error

Remanufacturing

Realized high precision

PV=0.14$\mu m$/100mm

Straightness error of X-slide

PV mean 60 nm

High precision