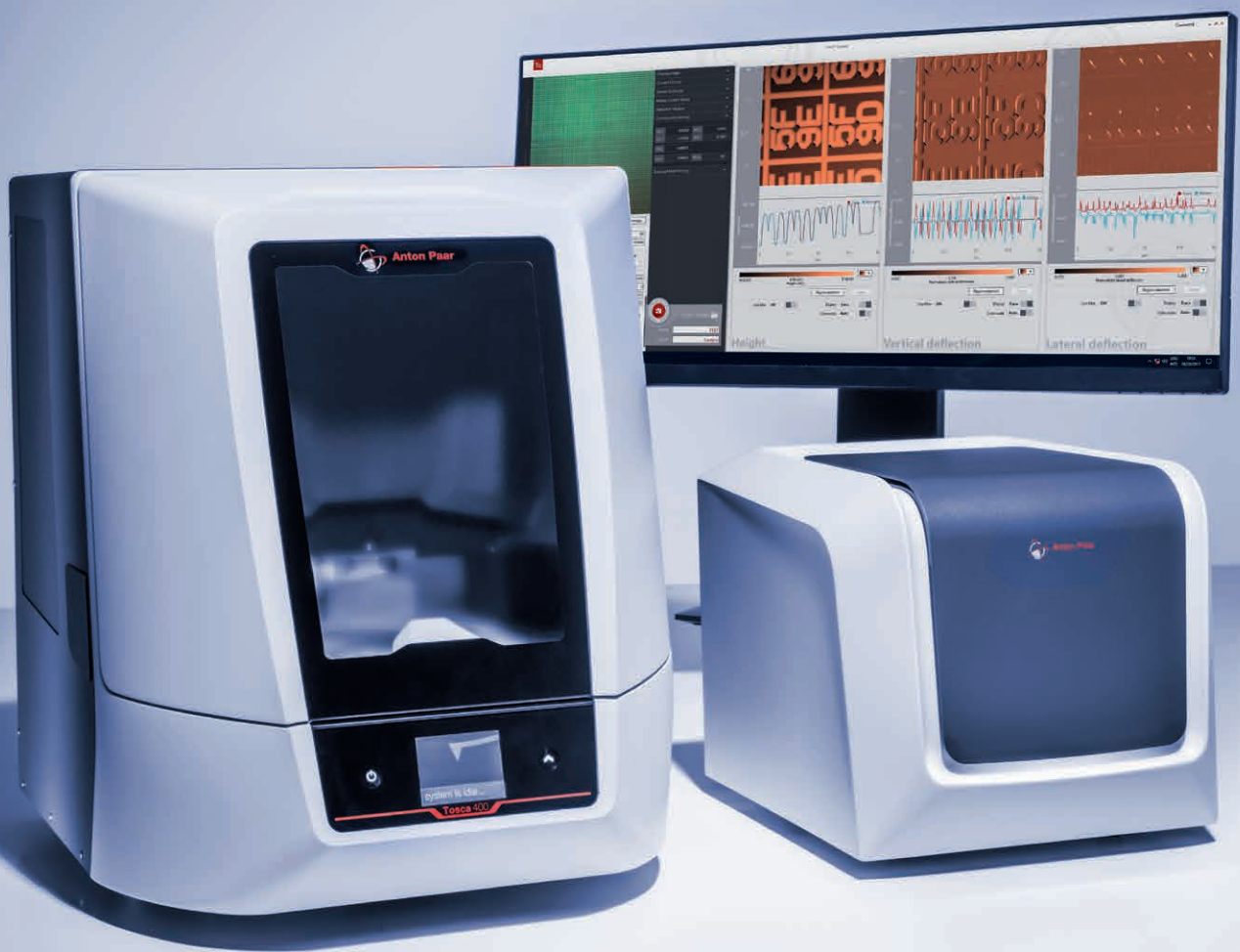


Atomic Force Microscope





Peak Performance AFM.

No complexity, just simplicity

We open the way for real industrial AFMs

Atomic force microscopy provides real three-dimensional information on surface topographies. It is a standard method for material science on the nanoscale used at universities and research centers.

The journey to AFM started in 1985, when this technology was invented by Benning et al. Over the past decades the technology was developed further and now covers, besides surface topographies, a huge number of other mechanical and electrical material properties such as friction, phase, electrical and thermal conductivity/resistance, glass transition temperature, melting temperature, stiffness, modulus, adhesion, surface potential, capacitance, magnetism, electrochemistry, and many more.

On the one hand, this technology was and is still mainly used by academia and research centers due to the very complicated handling of conventional AFM instruments. On the other hand, the demand from industry for complex nanosurface analysis is growing continuously as companies are confronted with new materials and research topics.

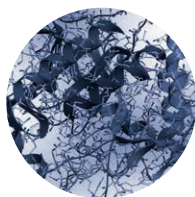
Anton Paar, as a well-established developer, producer, and distributor of highly accurate laboratory instruments and process measuring systems predominantly for industry, now meets these demands by introducing Tosca™ 400, an AFM uniquely designed for industrial users. It combines premium technology with user-friendly operation, which makes it fit for industrial

users as well as scientists. Automation and a workflow-oriented control and analysis software are integral elements on every level of operation, further increasing efficiency and simplifying the handling of AFM measurements.

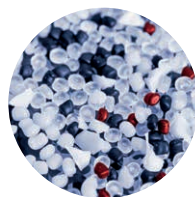


Applications

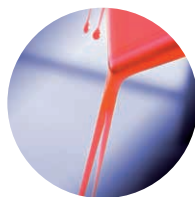
Discover how your material performs – with peak performance AFM.



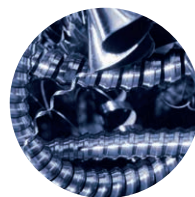
Soft organic materials



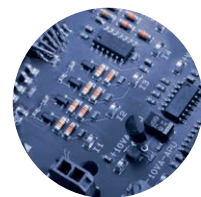
Polymers



Coatings



Hard metallic and ceramic systems



Semiconductors

Key steps on your way to peak performance

Automatic laser alignment

Tosca™ 400 provides a fully automatic laser alignment function: After loading the cantilever the instrument carries out the laser alignment automatically. In this way the whole process takes less than 60 seconds, even for inexperienced users.

Large scan area in all directions combined with the highest accuracy

The X-Y scan range of up to 100 μm covers a wide range of applications. The X-Y scan location can be regulated very easily by the click-and-move navigation of the Tosca™ control software. Accurate positioning and scanning of your sample is guaranteed.

With a huge Z range of 15 μm , it is possible to acquire surface topographies in a wide X-Y area and perform roughness analysis on a large Z scale.

The easiest engagement procedure on the AFM market

The engagement procedure brings the cantilever in contact with the sample surface. This is one of the most complex procedures when operating an AFM. Tosca™ 400 overcomes this problem by implementing a side-view camera that enables an engagement procedure which does not require the instrument to be opened to check the position of the cantilever. A closed instrument leads to higher accuracy due to stable temperature conditions.





Compatible with all cantilevers

There are many different cantilever brands on the market – Tosca™ 400 allows you to use your favorite one, regardless of the brand or manufacturer.

State-of-the-art sample navigation

Quickly jump from one position on your sample to the next: After loading and initializing Tosca™ 400, you can start an overview image of the whole sample table. Simply click on the desired position inside the overview image and the instrument navigates to the area of choice for the next measurement.

Workflow-oriented control and analysis software which meets the demands of industry

Tosca™ Control is a workflow-oriented and easy-to-use software tool to operate the AFM. It enables you to set up the instrument and perform measurements with just a few clicks. All measurement results are directly saved for later evaluations of surface topography as well as metrology and imaging analysis with Tosca™ Analysis. The state-of-the-art user interface and workflow templates for automated analysis meet long-held industry demands for smooth operation procedures in AFM.

How to gear up for your journey: Clever companions



Probemaster

You now have the perfect tool for fast and safe cantilever exchange – a game changer in the world of atomic force microscopy. With this cantilever exchange tool the complicated handling of cantilevers is a thing of the past. Just place the cantilever anywhere in the marked area of the Probemaster and easily slide it into the actuator body. There is no need to use tweezers for positioning the tiny cantilever anymore.

Due to the extensive space for placing a cantilever, Probemaster can easily be handled by inexperienced users. Damages to often expensive probes are prevented by the automatic positioning of the cantilever into the actuator body.



Active vibration isolation

The active vibration isolation is a necessary accessory for measurements at extremely high resolutions, especially on the sub-nanometer scale. It compensates for vibrations caused by, for example, vehicles passing by the laboratory building. Distortions or measurement errors are eliminated. The compact design, the short settling time, and the automatic load adjustment make the vibration isolation an essential tool that is space-saving, easy to handle, and ready to use within a few seconds.



Acoustic enclosure

The acoustic enclosure for Tosca™ 400 ensures noise-free and extremely accurate measurements on the sub-nanometer scale. Interfering noises such as air conditioning, closing doors, or voices are damped so that they do not influence the measurement in any way. The enclosure is extremely robust due to its steel frame but still moves easily on its integrated wheels. In this way it can easily be transported from one laboratory space to another.

Specifications

| Scanner | |
|--|--|
| X-Y scan range | 100 μm x 100 μm |
| Z scan range | 15 μm |
| Sample size | |
| Max. sample diameter | 90 mm |
| Max. sample height | 25 mm |
| Max. sample weight | <600 g |
| Motorized stage | |
| X-Y stage | 100 mm travel |
| Z stage | 85 mm travel |
| Position repeatability (uni-directional) | <1 μm |
| Video microscope | |
| Camera | Color, 5 megapixel, CMOS sensor |
| Field of view | 1.73 mm x 1.73 mm |
| Spatial resolution | 5 μm |
| Focus | Motorized focus |
| Overview camera | |
| Camera | Color, 5 megapixel, CMOS sensor |
| Field of view | 40 mm x 40 mm |
| Spatial resolution | 50 μm |
| Side-view camera | |
| Side-view camera | Black and white, range of view 30 mm in height |
| Standard modes | |
| Imaging | Contact mode, tapping mode (including phase image), lateral force microscopy |
| AFM unit | |
| Dimensions (D x W x H) of AFM unit | 490 mm x 410 mm x 505 mm |
| Weight of AFM unit | 51.1 kg |
| Dimensions (D x W x H) of controller | 340 mm x 305 mm x 280 mm |
| Weight of controller | 7.8 kg |

