

# METROTOM®. Visible Metrology.



We make it visible.

# Maximum Demands on Quality



The trend of reducing industrial manufacturing processes is continuing despite the high number of products and increasingly shorter product lifecycles. At the same time, the demands on the quality of the products are rising.



The high functionality and aesthetics of the finished product require optimized processes and precise manufacturing tools. Their development and fabrication place maximum demands on the measuring and inspection technology.

If maximum demands on product quality are also among the leading values in your company, then Carl Zeiss is the partner you have been looking for.

With the help of Metrotomography®, the fusion of metrology and computer tomography, Carl Zeiss offers a solution to further increase the productivity of your processes and the quality of your products.

# METROTOM



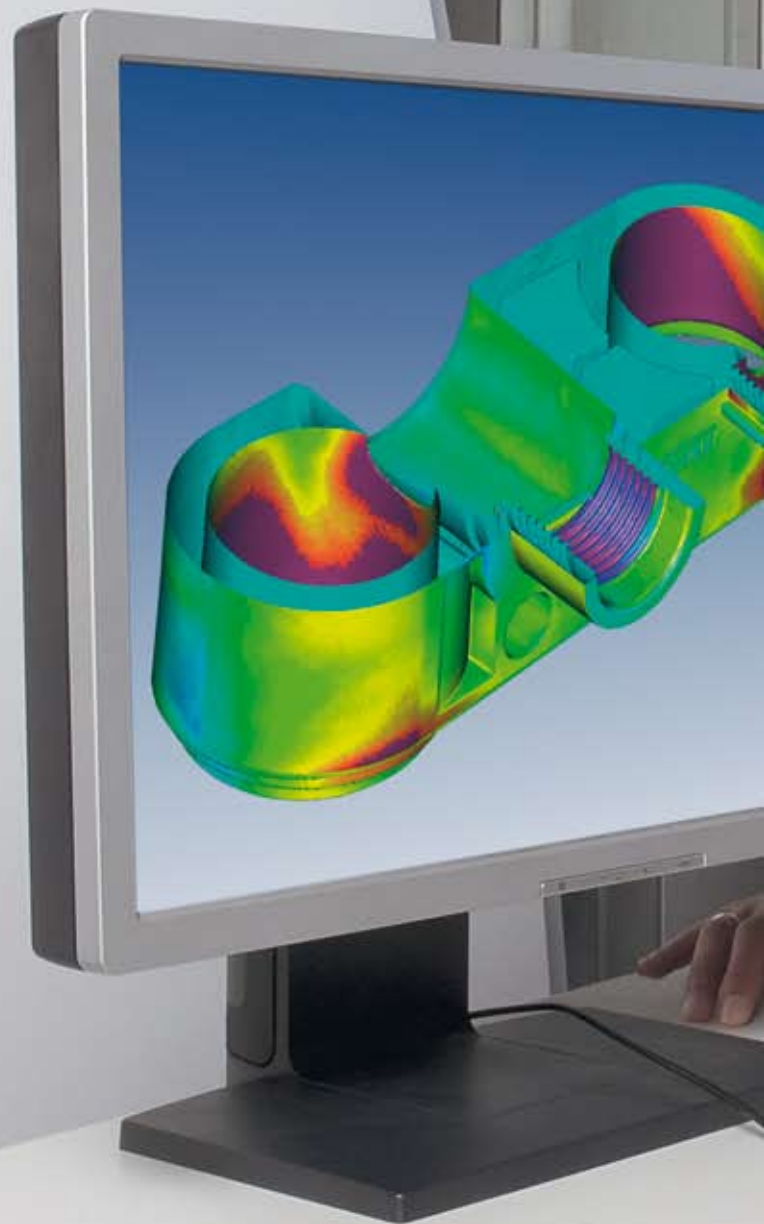
## Measuring Technology of the Future

**METROTOM® from Carl Zeiss – the door to measuring technology of the future. Place your workpiece in the measuring cabin, start the scanning process. An in-depth quality analysis is available shortly thereafter.**

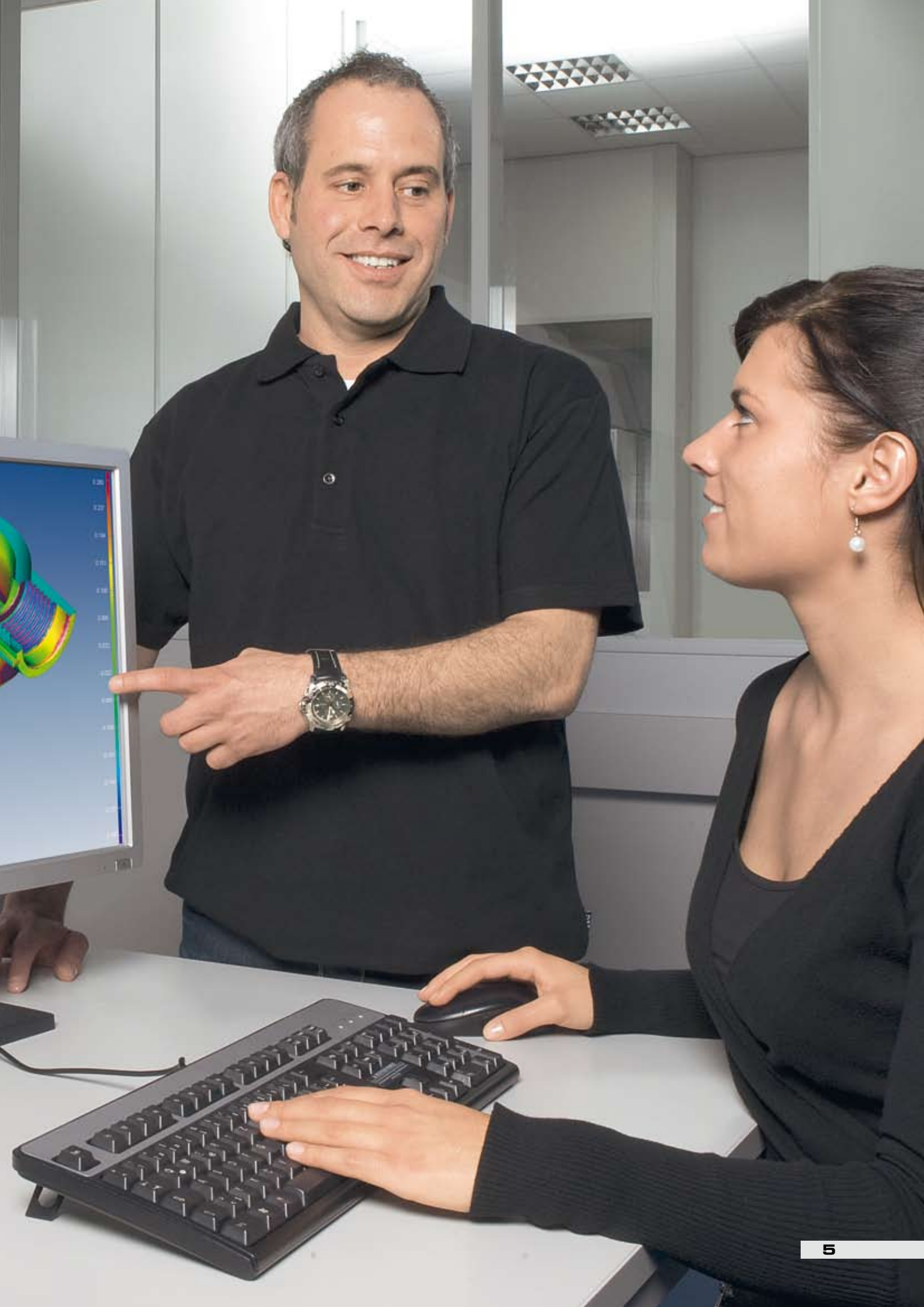
Several evaluation options are available – from an in-depth, easy-to-understand color display of the geometry comparison up to a detailed prototype test log. With metrotomography, the same digital dataset can be easily used to visualize and measure structures that would have required destroying the parts with traditional coordinate measuring machines.

Be it a porosity or damage analysis, or an assembly, defect or materials analysis – everything is possible with the help of the 3D volume model.

Metrotomography considerably reduces the development process, analyzes the quality of the production process and visualizes part defects in next to no time.







# The Leader in Accuracy and Precision

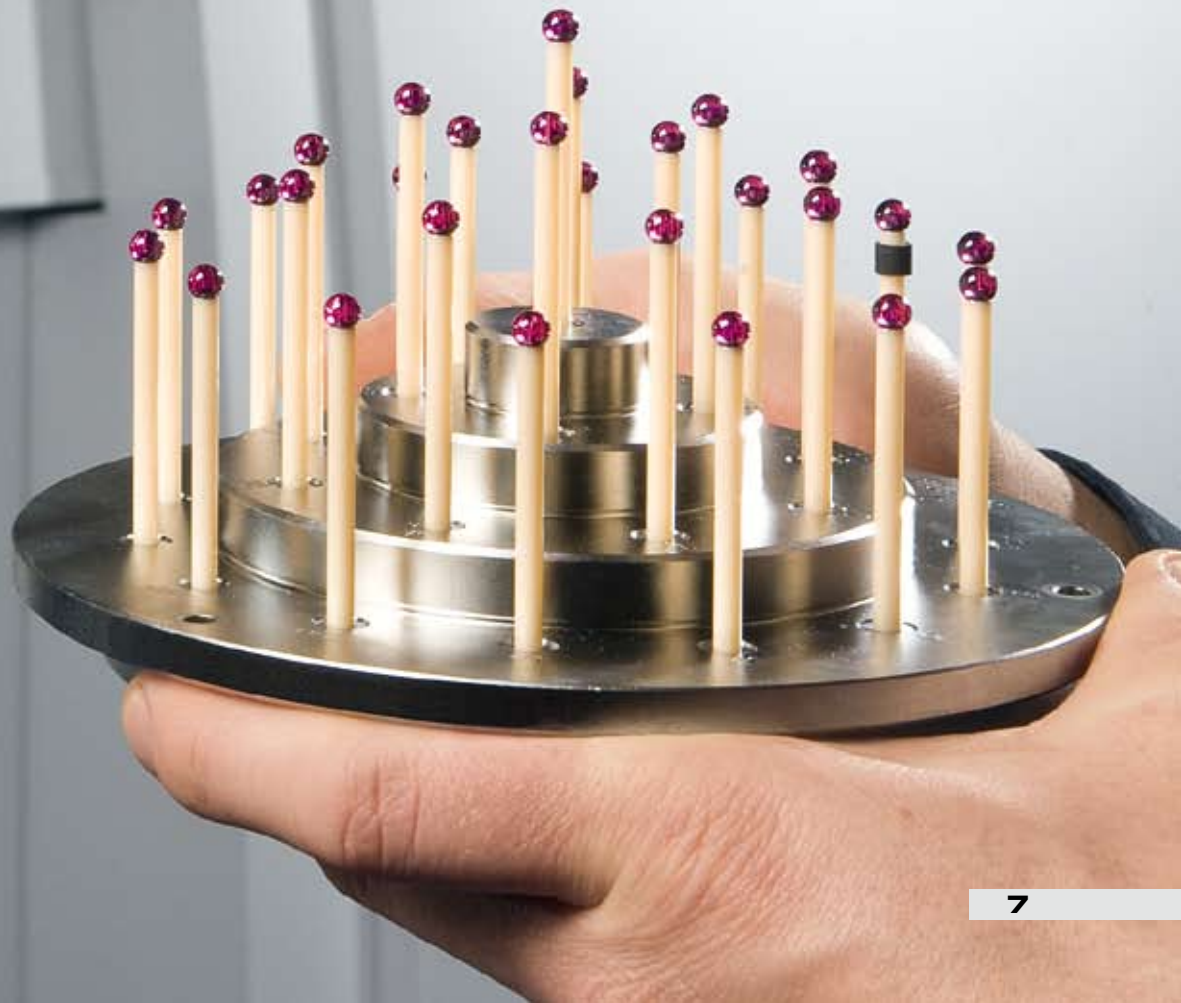
### Maximum measuring accuracy\* without additional reference measurements

METROTOM from Carl Zeiss for industrial quality assurance is calibrated using a patent-pending procedure. With this procedure, Carl Zeiss guarantees the specified accuracy of the measuring result without additional measuring runs for contact or optical reference measurements – a key benefit of computer tomography with METROTOM. The results are traced to the linear standard of the PTB (German National Metrology Institute) using calibrated standards and standardized methods.

Carl Zeiss has submitted a patent application for the procedure used to calibrate METROTOM. The assembly and acceptance process is based on the same principle used for ZEISS coordinate measuring machines. Proven linear guideway and bearing technology ensures maximum precision. All travel axes are CAA corrected. All metrological evaluations are made using PTB-certified CALYPSO® software from Carl Zeiss.

\*All information complies with the specifications of the new VDI directive 2630 "Computer Tomography in Dimensional Metrology"

METROTOM





# Intuitive Operation

**Learning to use the METROTOM CT-based coordinate measuring machine is unbelievably easy. Following a short training period, users are able to tomograph parts and independently perform measurements and material inspections on the resulting 3D volume models.**

A conveniently accessible, ergonomically designed machine portal enables users to place their workpieces on the rotary table. A large window allows them to view the current position of the workpiece at any time. Operating the measuring machine is just as easy. The progress of the measurement can be seen on a monitor.

Those who already use CALYPSO, the leading measuring software from Carl Zeiss, can switch to metrotomography with practically no additional training and take advantage of its full functionality. Measurement plans for traditional coordinate measuring machines are compatible with METROTOM plans. Creating an initial sample test report usually requires several hours. With CALYPSO, you can generate the measurement plan offline and start it immediately after completion of the metrotomography procedure. Duration of the entire process: just a few minutes. Efficient planning puts the initial sample test report in your hands in one hour.

The complete 3D capture of a workpiece also makes it possible to compare CAD models and measurement datasets. The color-coded displays of the entire workpiece provide meaningful information about its dimensional stability.





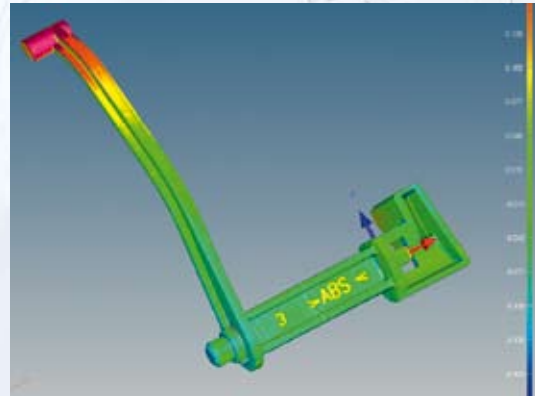


# Increase Efficiency

**The capabilities of metrotomography provide enormous potential to optimize internal processes.**

## Measure hidden structures non-destructively

The innovative metrotomography procedure makes structures on parts visible and permits metrology evaluations, which would otherwise be very time-consuming and technically involved with standard measuring technology. With METROTOM systems, parts with difficult-to-reach structures can be quickly and easily measured non-destructively. It is no longer necessary to cover the parts with synthetic resin and gradually destroy them to be able to measure two-dimensionally plane-by-plane. With metrotomography, a requested initial sample test report is generated in a fraction of the time needed using traditional, destructive measuring technology.

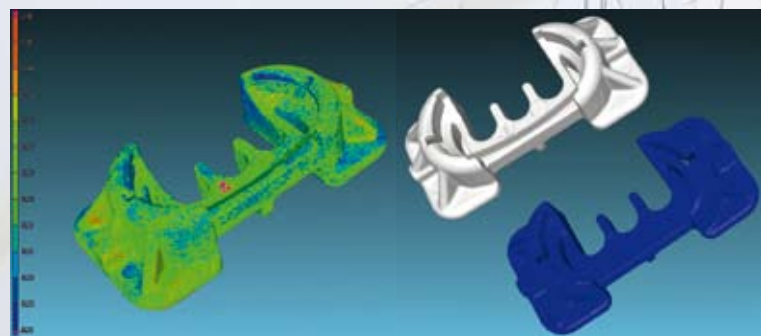
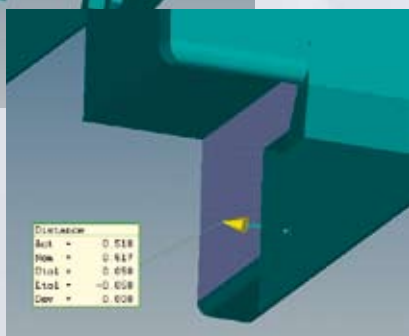
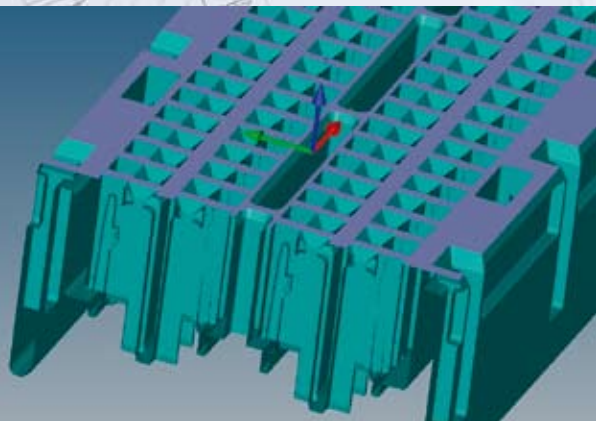


## Meaningful results

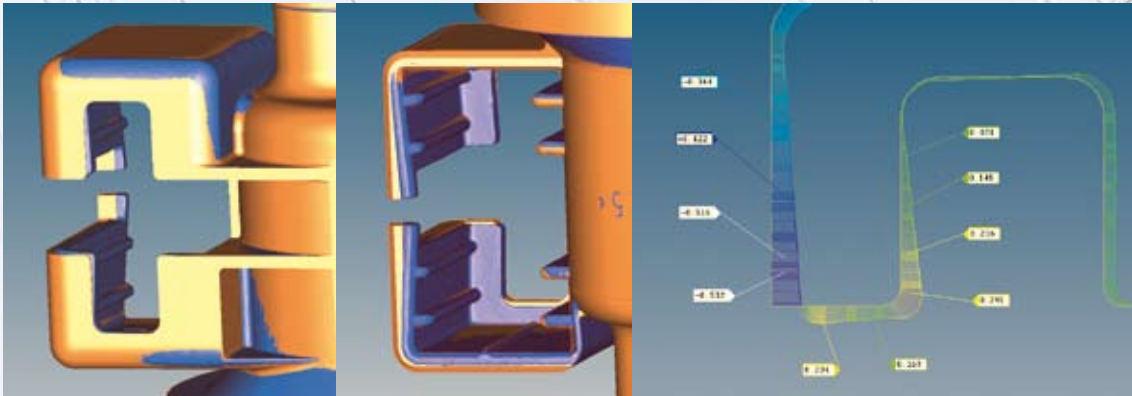
In addition to dimensional metrology, the complete 3D capture of a workpiece makes it possible to compare CAD models and measurement datasets. The color-coded, easy-to-interpret display of a geometry comparison quickly and clearly provides meaningful information about the dimensional stability of the entire workpiece – another way of saving time and money.

## Identify part differences

The generated volume dataset can be saved and archived for documentation purposes. During part requalification, users can access the original dataset at any time – even years later. Analysis errors caused by aging or temperature, or moisture-related part changes are thus avoided.







### Correct tools

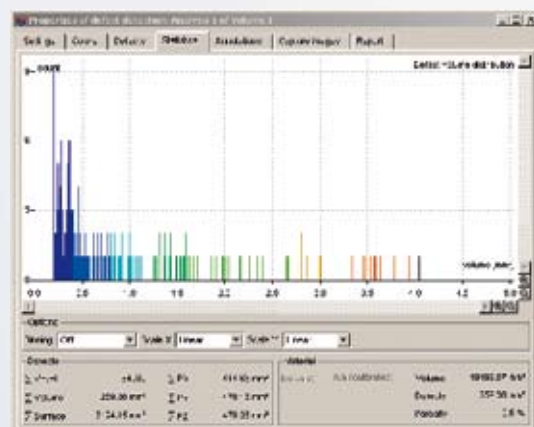
Metrotomography enables injection-molding or die-casting toolmakers to drastically reduce correction cycles during tool development. The part deviations determined by the measuring software are used to optimize the tool form. The reduction of the tool corrections leads to faster availability of the parts on the market. Based on the statements of metrotomography users, the savings potential here is more than 50 percent of the tool development time depending on the part.

### Destruction-free defect analysis

Using the same dataset, a non-destructive material and defect analysis can also be performed without significant additional work. For example, porosity analyses about the distribution and size of air inclusions in the part can be performed to check the process parameters and the correct dimensioning of the injection channels.

### Reverse engineering

CAD models of existing finished parts must be repeatedly generated. Using additional software packages, the desired CAD data can be generated from the METROTOM voxel data.



# The Ideal Machine for a Wide Range of Parts



**METROTOM 1500 – the ideal, CT-based coordinate measuring machine for a wide variety of applications regarding the size and material density.**

METROTOM 1500 was specially developed for a wide performance range to meet the different requirements encountered in internal or external measuring and qualification labs on a daily basis. Parts made of plastic, ceramics or composite materials, as well as magnesium, aluminum and steel can be dimensionally measured and highly efficiently evaluated.

**Always ideal detail resolution and measuring accuracy**

The ideal part magnification is selected for each application through the gradual positioning of the part between the X-ray source and the detector. The user always receives optimal detail resolution and measuring accuracy. METROTOM 1500 can also be equipped with a higher-resolution detector to make even finer part structures visible. You can enlarge the detailed view if very small features on a large workpiece need to be measured with high accuracy. This is then evaluated in reference to the entire part. This function is enabled through the precise positioning of the part in different directions using the vertically adjustable rotary table.

**Long service life thanks to X-ray tube technology**

The open X-ray tube technology used enables a practically unlimited system service life and turns METROTOM 1500 into a sustained economical investment.

With its radiation protective enclosure, METROTOM 1500 meets the requirements of a full-protection machine. The system can thus be set up practically anywhere. There is no risk of radiation exposure for the environment or the operator. The machine door is motorized. METROTOM 1500 can also be loaded by a robot using an external controller.

## Performance features

<b>Tube</b>	225kV/225W
<b>Detector</b>	1024 x 1024 pixels
Optional	2048 x 2048 pixels
<b>Measuring range</b>	Ø300 x 350 mm
<b>Lifting table adjustment range</b>	150 mm
<b>Source-detector distance</b>	1500 mm





METROTOM 1500



# Your Choice for Compact Precision Parts



**METROTOM 800 is tailored to the requirements of the injection molding industry. It meets all the requirements of mid-sized companies in the plastic, composite material and ceramic part industry. It also features an attractive price/performance ratio.**

Minimal system maintenance costs and maximum availability were decisive during the development of METROTOM 800. This was achieved through the use of maintenance-free micro-focus X-ray tube technology. Extremely small focal points enable razor-sharp projection images on the detector – the foundation for high measuring accuracy. The METROTOM 800 detector delivers almost three million pixels for very high detail recognition.

#### **Continuously adjustable travel mechanism**

Inside the cylinder-shaped measuring range, parts can be placed in any position in the beam path via a continuously adjustable travel mechanism. The detector is always optimally illuminated with the part projection. Together with the vertical adjustment, this function allows you to enlarge specific areas of the parts to measure details in relation to the entire part.

Through the use of polymer concrete for the enclosure, the use of lead can be largely avoided. Here, Carl Zeiss demonstrates how the utilization of modern materials can provide maximum protection of employees, system operators and the environment – while implementing perfect measuring technology, ergonomic excellence and a corresponding design.

#### **Performance features**

<b>Tube</b>	130kV/39W
<b>Detector</b>	1900 x 1512 pixels
<b>Measuring range</b>	Ø125 x 150 mm
<b>Lifting table adjustment range</b>	290 mm
<b>Source-detector distance</b>	800 mm





**Carl Zeiss**  
**Industrielle Messtechnik GmbH**  
73446 Oberkochen/Germany  
Sales: +49 (0) 1803/ 336-336  
Service: +49 (0) 1803/ 336-337  
Fax: +49 (0) 7364/ 20-3870  
Email: [imt@zeiss.de](mailto:imt@zeiss.de)  
[www.zeiss.com/imt](http://www.zeiss.com/imt)